SOUTHWEST COASTAL LOUISIANA
REVISED INTEGRATED DRAFT FEASIBILITY REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

ANNEX T

Wetland Value Assessments

Project Name:
Southwest Coastal Louisiana Feasibility Study

Sponsoring Agency:
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Project Area:
The project is located in southwest Louisiana (Calcasieu, Cameron, and Vermilion Parishes).

Problems and Opportunities:
Given the area's low elevation, flat terrain, and proximity to the Gulf of Mexico, the people, economy, unique environment, and cultural heritage of Southwest Louisiana are at risk due to storm surge flooding and wave impacts from tropical storms. Land subsidence, combined with rising sea level, is expected to increase the potential for coastal flooding, shoreline erosion, saltwater intrusion, and loss of wetland and chenier habitats in the future.
System-wide problems and opportunities were used to identify and define more geographically specific problems and opportunities. Opportunities to solve the problems include:

- Incorporate structural and non-structural hurricane and storm surge reduction solutions to reduce the risk of damages and loss of life.
- Evaluate ecosystem measures that contribute to operation and maintenance of navigable waterways.
- Improve system hydrology to restore wetlands.
- Maintain fresh and intermediate marsh by reducing salinity levels.
- Improve banks and shoreline by reducing erosion.

Goals and Objectives:
In January 2009, the USACE and CPRA executed a Feasibility Cost-Share Agreement for the Southwest Coastal Louisiana (SWCL) Feasibility Study. The study purpose is to produce a feasibility analysis and environmental analysis that culminates in a single, combined feasibility document. The study includes the activities and tasks required to identify and evaluate alternatives and the preparation of the decision (feasibility) document. Both hurricane protection and coastal restoration are included in the feasibility effort.

The goals are to provide hurricane and storm damage risk reduction for Calcasieu, Cameron, and Vermilion parishes to reduce flooding induced by storm surge, and to provide ecosystem restoration to achieve ecosystem sustainability. Specific planning objectives will help solve the problems by taking advantage of opportunities. Five objectives have been identified.

- Objective 1. Reduce the risk of economic losses from flooding caused by hurricanes and storm surges.
    - Metric: reduction in annual damage costs.
    - Data required: average annual expenditures on repairs due to storms and storm surges.
    - Data collection: HEC-FDA, HEC-RAS, State of Louisiana Master Plan, and ADCIRC model results.
- Objective 2. Improve hydrologic connectivity of wetlands to prevent scouring and loss of wetland soils and reduce storm surge-deposited saltwater residency time.
    - Metric: reduction of salinity in major watersheds (Cameron-Creole Watershed and Mermentau Basin) to average levels (for the time of year).

- Data required: salinity measurements.
- Data collection: Coastal Restoration Monitoring System (CRMS) station salinity gauges.

- Objective 3. Reduce flooding in non-flotant fresh and intermediate marshes during the vegetation growing season (March – September).
  - Metric: reduction in water surface elevation above marsh surface.
  - Data required: water and marsh surface elevations.
  - Data collection: CRMS or other hydrologic monitoring station and bathymetric/topographic surveys (in NAVD88).
- Objective 4. Reduce erosion of canal banks and shorelines in critical areas to protect adjacent wetlands.
  - Metric: reduction in shoreline erosion rate.
  - Data required: shoreline position.
  - Data collection: aerial imagery (e.g., Digital Ortho Quarter Quadrangle), LiDAR surveys, and bathymetric/topographic surveys.
- Objective 5. Restore critical geomorphologic features, such as marshes and cheniers, to maintain their function as wildlife habitat and as protective barriers to inland areas.
  - Metric: increase in subaerial marsh acreage, tree canopy, and understory coverage (for cheniers) over time.
  - Data required: marsh/water acres, tree canopy, and understory coverage.
  - Data collection: aerial imagery (e.g., Digital Ortho Quarter Quadrangle), LiDAR surveys, bathymetric/topographic surveys, and forest vegetation surveys.

Project Features:
For early comparison purposes, the measures were grouped into measure types as follows:

- Hydrologic and salinity control. These are measures that would improve hydrologic connectivity of wetlands, some of which would also reduce losses from hurricane and storm surges.
- Shoreline protection/stabilization. These are measures that would reduce erosion of canal banks and shorelines in critical areas to protect adjacent wetlands.
- Marsh creation/restoration. The measures would create or restore marsh, which would contribute to hydrologic connectivity as well as provide storm surge buffers.
- Hurricane protection/risk reduction. These include both structural and non-structural features, programs, and activities.
- Unique natural features restoration. This grouping included restoration of chenier ridges, as well as measures to restore and maintain oyster reefs.
- Miscellaneous measures. These ranged from watershed sediment and water level management measures to measures that would affect waterways, such as navigability.

Monitoring Information:
Many relevant state, Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), and other projects were used for information that helped to develop the existing conditions and future projections.

General Assumptions:
- Overall:
  - TY0 will be 2025
  - TY50 will be 2075
  - TY(-16) = 2009 (latest year for which habitat data is available for projecting acreages)
  - TY34 will be 2059 (this is the year that 10 inches of accretion would have accumulated, and marsh creation cells would revert to historic loss rates)
  - Since the synergy between shoreline protection and marsh creation features is low (~0-5%), there is no need to develop the projects concurrently (the variability falls within model noise).

Habitat Evaluation Team (HET) and Project Delivery Team (PDT) consensus was that these features can be developed and evaluated independently.

- U.S. Geological Survey (USGS) Loss/Gain Rates use 10 data points from 1985 to 2009 to draw a trend line (linear regression), excluding 2005 and 2008 data (post hurricanes):
  - The trend line method evens out the effects of low water, high water, storms, etc.
  - USGS has moved away from using a compound formula to using a linear formula for loss rates.
- The features will be evaluated at the Intermediate Relative Sea Level Rise (RSLR) scenario, and loss rates will be adjusted according to the Adjustment Factor methodology developed by U.S. Fish and Wildlife Service (USFWS).

WVA Analysis for Focused Array:
For the Focused Array of alternatives[1], the State of Louisiana's Master Plan modeling effort was used with input from the hydrodynamic model (MIKE-FLOOD) to estimate land and water changes. The alternatives were run in the MIKE-FLOOD model under the Intermediate RSLR scenario to predict salinities, water levels, and flows. The results of the MIKE-FLOOD modeling effort were input into the various modules of the Master Plan model to predict wetland loss and other trends over time[2].

For Marsh Creation and Shoreline Protection projects, the WVA analysis process was performed as described in the "Wetland Value Assessment Project Information Sheet / Initial Array of Alternatives / Southwest Coastal Louisiana Feasibility Study". To assess Hydrologic and Salinity Control measures, basin-wide modeling applied at the alternatives level provided information required for assessing the benefits for the alternatives of the focused array. Benefits of the Marsh Creation and Shoreline Protection measures were subtracted from this total benefit to estimate the benefits associated with the Hydrologic and Salinity Control measures in each alternative. These relative benefits were used to adjust alternatives as necessary to optimize benefits.

Target years were chosen so that changes in the trajectories of salinity and other important variables could be captured. The HET anticipates a fairly rapid equilibrium in salinity changes due to project implementation, with a fairly linear change due to sea level rise over time. To capture this, target years were concentrated initially, with fewer required later in the project life. We evaluated conditions at TY0, TY1, TY5, TY25, and TY50. This corresponds to 2025, 2026, 2030, 2050, and 2075. The 2025 maps were generated by running existing conditions forward to 2025, and the FOWP conditions were projected forward from there to 2075. The alternatives (Future With Project [FWP]) included all features being added at day one of 2025 (designated as 2025.001). This approximated TY1 conditions (post-construction).

Because WVA models are habitat-specific (e.g., fresh/intermediate marsh, brackish marsh, and saline marsh), the areas of interest were identified based on vegetation (habitat) type. The Master Plan modeling performed by the USGS divided the study area into 152 hydrologic "boxes" for the analysis. Adjacent boxes with similar habitat types were grouped where possible to simplify WVA calculations. A total of 30 "subgroups" were identified for the four habitat types (**Figure 1**). This delineation was performed with input from USGS to determine projected habitat zones to allow the application of the appropriate WVA model. Specific information required for each variable within each area of analysis is presented below, with an indication of how the models were applied for generating the values.

[1] See Plan Formulation section of Feasibility Report for information on how the Focused Array was developed.
[2] For information on the Master Plan modeling components, see the appendices of *Louisiana's Comprehensive Master Plan for a Sustainable Coast* (2012).

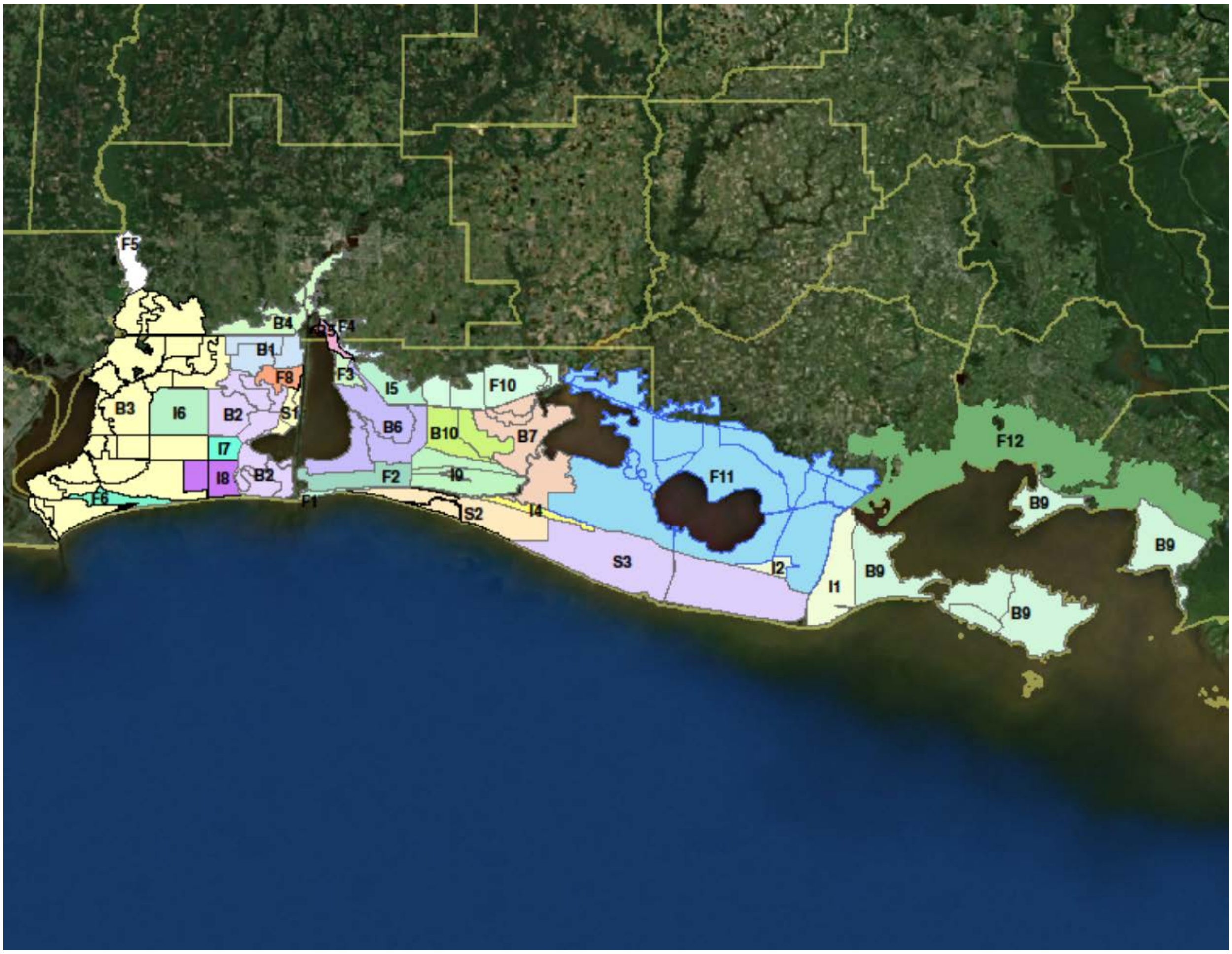

Figure 1. Subgroups in the study area (F = Fresh, I = Intermediate, B = Brackish, and S = Saline).

The data sources for the basin-wide WVA models are:

V1 – Percent of Project Area with Emergent Wetlands

For V1, the acreages of emergent wetlands and open water were generated at each target year by the Vegetation Module of the Master Plan. The model output is in squared kilometers, which was converted to acres for the analysis. These acre values were used to calculate the AAHUs from the suitability indices, as well as to calculate the V1 component (wetland acreage divided by total area).

V2 – Percent of Open Water with SAV

For V2, the average percentage of open water covered by submerged aquatic vegetation (SAV) is projected for each target year. SAV distributions are dependent on salinity and water depths, so are expected to change over time. The five target years outlined above were sufficient to capture the trends and major break points. The Vegetation Module of the Master Plan model provided these percentages.

V3 – Interspersion

Interspersion (V3) is the degree to which the marsh is contiguous or broken. The more fragmented the marsh, the higher the interspersion class and the lower the suitability. This was determined for TY0 from the base map of conditions at 2025. Projections were based on anticipated losses in the area of analysis. The maps were based on output from the Master Plan model, and were prepared for 2025, 2050, and 2075. Interpolation of interspersion for interim target years was made based on the relative acreage loss of wetlands and marsh patterns. The 2025.001 maps would be used for TY1 Interspersion for the FWP alternatives.

V4 – Percent of Open Water <1.5 ft Deep

As marsh is lost, the amount of open water increases. The most recently created water is usually assumed to be shallow (less than 1.5 ft deep). This and other pre-existing shallow water provided high-quality habitat for fishes, invertebrates, and SAV. The projections of shallow open water correspond with the target years selected for acreage projections. The estimation of percent shallow water was provided by the Master Plan model by querying the area of open water less than a contour depth of 1.5 ft.

V5 – Salinity (annual or growing season)

Salinity determines the wetland habitat type, but salinity variations within the habitat can have severe implications, especially in fresh and intermediate marshes. For fresh and intermediate marshes, the average salinity during the growing season (March to November) was calculated. For brackish and saline marshes, the average annual salinity was calculated (the plants are less sensitive to changes in salinity). Outputs of the monthly salinities from the MIKE-FLOOD model were used to calculate the annual and growing-season averages.

V6 – Aquatic Organism Access

Access by estuarine-dependent fishes and invertebrates is a critical component of habitat quality. This variable is also indicative of hydrologic connectivity, which allows nutrient exchange. The access value ranges from open access (1.0) to completely impounded, which ranges from 0.1 for brackish and saline marshes to 0.3 for fresh marsh. This is determined by aerial photography, site visits, construction reports, and the nature of the structures to be installed. The Master Plan and MIKE models were not used for this calculation.

Sensitivity Analysis:

The USACE requires that planning models be coordinated for certification through the Ecosystem Restoration Planning Center of Expertise (ECO-PCX). Version 1.0 of the CWPPRA Coastal Marsh Community model is approved for use for the SWCL project. However, as indicated by the ECO-PCX, there are a number of unresolved issues related to the form of suitability graphs for Variables 1, 2 and 3 (V1= Percent Emergent Marsh, V2= Percent Open Water Covered by Submerged Aquatic Vegetation, and V3= Marsh Edge and Interspersion) and the aggregation methods used to combine the marsh habitat units and open water habitat units for each sub-model (Kitch 2012). The previous suitability curve for Variable V1 reached a maximum suitability at 100% coverage (USFWS 2009). Based on research, however, the maximum productivity of a marsh occurs when coverage is between 50% and 70% (Battelle 2010). Therefore, the suitability curves were restructured so that the WVA V1 variable obtained a maximum in this range, with lower suitability below 50% and above 70% cover.

To increase the understanding of the sensitivity of the model to the unresolved issues and the impact the model differences may have on decision-making, the hydrologic and salinity control measures (see the "WVA Analysis for Focused Array" section above) in the SWCL Feasibility Study underwent a sensitivity analysis that utilized the CWPPRA suitability index curve that has V1=100% and SI=1.0 and a newer "Revised" suitability index curve that has V1=50%-70% and SI=1.0.

The revised curve for the V1 variable no longer accounts for habitat integrity. It only accounts for productivity. In the revised model, the coverage for V1 based on biological productivity is optimized between 50% and 70% marsh cover. Likewise, the suitability curve for the V2 variable was also revised to not only shift the optimal submerged aquatic vegetation (SAV) coverage to between 50% and 70%, but also to increase the minimum suitability at 0% coverage to 0.6 (from 0.3). This means that open water would have a greater habitat value under the revised model. "Multiple benefits (*e.g.*, flood attenuation, water quality, and species richness) are left out of the model, but a full range of ecosystem services is not intended for inclusion in the model" (Battelle 2010). In the revised WVA, the suitability values were not changed for V3. At an emergent marsh cover (V1) value between 50% and 70%, the interspersion class would be mainly Class 3. As a result, whereas V1 would have a SI value of 1.0, V3 would have a value of 0.4. Since the V1 variable carries the most weight in the calculations, if all other variables were optimal, the HSI_{marsh} for V1 = 50% and V3 = 100% Class 3 would be 0.65 with the original model and 0.93 with the revised model. Taking an area of degrading marsh and applying restoration activities to it would result in greater environmental benefits under the original WVA model than under the revised model. The results of the sensitivity analysis described above illustrate this point in **Table 1** below. Also, the application of the revised model would greatly increase the calculated cost per AAHU, which is the main driver for the incremental cost-effectiveness analysis.

Table 1. Summary of 2014 Intermediate RSLR Final Array Revised and CWPPRA Certified WVA Outputs.

	Revised	CWPPRA		
Alternative	AAHU	AAHU	Difference	Diff (%)
NER1	9475	15726	-6251	-40%
NER2	8817	12737	-3919	-31%
NER3	8452	12048	-3596	-30%
NER4	5618	9165	-3547	-39%
NER5	913	4587	-3674	-80%
NER6	6438	12792	-6353	-50%

Hydrologic and Salinity Control Measure Assumptions:

F1 – (freshwater hydrologic and salinity control measure)

FWOP TY0 Baseline conditions:
Feature area: 2856 acres
Marsh area: 2520 acres
Open water area: 336 acres
V1 (% marsh) = 88%
V2 (%SAV) = 72%
V3 (marsh edge and interspersion) = 100% class 1
V4 (% open water <= 1.5 ft deep) = 3.8%
V5 (salinity) = 0 ppt
V6 (fish access) TY0 = 0.0001

WVA ASSUMPTIONS - SHORELINE PROTECTION MEASURES (used marsh models unless indicated)

GENERAL:

V1 (%Marsh)

- Original USGS-delineated project areas (from preliminary V1-WVA USGS analyses) were based on low/historic shoreline erosion rates. These areas were enlarged to encompass the acreage that would be lost under the Intermediate SLR scenario. Thus, V1 will zero out at TY50 unless a hard barrier prevents continued erosion, in which case V1 zeroes out prior to TY50.
- Enlargement of the project areas was accomplished by increasing the historic shoreline erosion rate with the annual wetland loss adjustment factors for Intermediate SLR (using it as a multiplier of acres/year lost).
- Used measure-specific shoreline loss rates, rather than subunit rates, for future acreage projections because of issues with applicability of subunit rates, i.e., 5a's subunit is gaining land, 16b measures are located in interior subunit where loss rate includes other factors than bankline loss, and in some cases shoreline erosion carries over into adjacent interior subunits. Thus, using measure-specific loss rate will be consistent across shoreline measures.
- Interior land loss rates were not applied to delineated project areas. It is assumed that shoreline erosion is the only factor governing loss in the project area.
- FWP - Continuous foreshore dike assumed to reduce shoreline erosion by 100%; dike maintained throughout study period.

- FWP - Segmented breakwaters assumed to reduce shoreline erosion by 50%; breakwaters maintained throughout study period.

V2 (%SAV)

- Existing data (WVAs, project monitoring, aerial imagery) were used to approximate TY0 (baseline) SAV coverage for the measure areas (assumed little change between existing conditions and 2025). In areas with little available information, SAV coverage estimates were supplemented with assumptions based on the suitability of local environmental conditions for SAV. SAV abundance and distribution are primarily controlled by salinity, water clarity, and water depth. Because there are several species that tolerate high salinities, coverage assumptions were based on conditions that would affect water clarity. SAV coverage was assumed to be low in water bodies with high wave action or current flow due to high turbidity and light attenuation, as well as because of direct physical erosion. In contrast, SAV coverage was assumed to be high in small, interior water bodies where there is little wave action and water movement. Water depth was also considered, and it was assumed that deeper water bodies would have less SAV coverage than shallower areas due to lower light transmission.
- FWOP – SAV coverage assumed to decrease due to increasing water depth, turbidity, and wave and current action. For shoreline protection measures, SAV coverage at TY50 is assumed to be 0% because the project area would be entirely Gulf, bay, or canal open water and SAV is not expected to occur in these areas for the above reasons. Intermediate target years are a proportional decrease from baseline SAV coverage to 0%.
- FWP – SAV coverage remains constant throughout study period for rock dike measures, which are assumed to stop shoreline erosion. For segmented breakwater measures, SAV coverage declines because shoreline erosion continues, albeit at a lower rate.

V3 (Interspersion)

- 2010 aerial imagery of project area compared against CWPPRA-developed examples of each Interspersion Class. Assumed little change between 2010 and 2025.
- FWOP – Interspersion gradually increases as marsh is converted to open water, the rate of which is dependent on V1 land projections. For Gulf shoreline measures, eroded marsh immediately becomes Class 5 (it becomes part of the Gulf), otherwise the remaining marsh is maintained at the baseline Class 1 (or Class 2 in the case of 6b3) because of overwash during shoreline recession.
- FWP – Because foreshore rock dikes are assumed to stop land loss in the project area, interspersion remains constant throughout study period. For segmented breakwaters, land loss continues (though at a lower rate) and interspersion changes in the same way as FWOP.

V4 (%Shallow Water)

- Existing shallow water less than 1.5 feet deep was estimated from nearby surveys or other available data. In lieu of data, it was assumed that areas of recent land loss would be less than 1.5 feet deep; older loss would be deeper. Assumed little change between 2010 and 2025.
- FWOP - Gulf shoreline measures, erosion converts baseline shallow water into deeper, Gulf waters. Other shoreline/bankline measures, all existing TY0 shallow water becomes deep at TY50 because of Intermediate RSLR (1.9 feet over 50 years). Marsh lost between TY1 and TY50 initially becomes shallow open water but then converts to deep water by TY50. Other target years are interpolated from these assumptions.

- FWP – Gulf shoreline measures, erosion converts baseline shallow water into deeper, Gulf waters. Other shoreline/bankline measures, baseline shallow water remains constant and increases somewhat due to accretion behind the rock dike measures.

<u>V5 (Salinity)</u>

- Data from nearby CRMS sondes or other available gages used for existing conditions. Assumed no change between 2010 and 2025.
- FWOP and FWP salinities held constant for each measure. The Chenier Plain H&H model will provide estimates of future salinities, which will be incorporated into continuing WVA analyses.

<u>V6 (Fish Access)</u>

- Derived from previous WVAs, professional knowledge, and interpretation of aerial imagery. Applied standard CWPPRA ratings to structures that may affect measure.

MEASURE-SPECIFIC:

<u>Measure 5a: Cameron Parish Shoreline</u>

- Measure is segmented rock breakwaters, beach nourishment (similar to CS-33 SF), or both.
- Analyze as rock breakwaters for initial screening. Will need more detailed analyses of construction alternatives during next phase of alternative formulation.
- No indirect benefit area associated with measure. No existing shoreline breaches, no projected breaches into wetlands north of highway. Measure would benefit infrastructure and Holly Beach.
- CS-33 project will be built around 2012-2013, and this project will reposition the shoreline Gulf-ward of its current location.
- Post CS-33-construction shoreline position and average recession rate across project length (8.1 feet/year increased to 12 feet/year for intermediate SLR) were used to predict the FWOP shoreline at 2025 and 2075. The shoreline recession rate corresponds to a loss rate of 11.4 acres/year.
- Shoreline recession will be applied to the template, which will not be allowed to transgress landward. Assume that shoreline recession will stop at Highway 27/82, based on importance of highway as an evacuation route and commitment to maintain road by locals, etc. Material lost due to shoreline recession would be lost to longshore transport or washed over the highway.
- Infrastructure at Holly Beach would also slow recession rates somewhat.
- Estimated a 473-acre area would be lost FWOP in Intermediate SLR scenario.
- Used Barrier Headland WVA model.
- Baseline (TY0) assumptions used information from CS-33 project and nearby CS-31 project.

<u>Measures 6b1-3: Rockefeller Shoreline Protection</u>

- Measures are segmented breakwaters.
- No indirect benefit area associated with measure. No existing breaches. With increased shoreline erosion, a shoreline breach could occur at western end of 6b1. However, as the Gulf shoreline rolls back a small "ridge" of coarser material is typically maintained, and this should help close small breaches. In addition, an existing network of terraces and levees should help protect interior areas by impeding water flow, and possibly capturing overwashed sediment.
- No barrier headland features (beach) evident, so used Saline Marsh WVA model.
- Baseline (TY0) assumptions used information from ME-18 project.

Measure 16b-west: Freshwater Bayou Bankline Protection

- Measure is foreshore rock dike.
- No indirect benefit area associated with measure. There are a few existing breaches in the bankline but these are largely canals that the proposed rock dike would not close. No new breaches projected to occur.

Measure 16b-northeast: Freshwater Bayou Bankline Protection

- Measure is foreshore rock dike.
- No indirect benefit area associated with measure. There are no existing breaches in the bankline. New breaches projected to occur into small ponds near the southern end of the measure; however, these breaches would not represent large-scale hydrologic connections to a wider area of interior wetlands (i.e., no other canals, bayous, or trenasses connect these ponds to interior areas). Furthermore, the impact of erosion on the shoreline of the ponds has already been accounted for in the direct benefit project area.

Measure 16b-southeast: Freshwater Bayou Bankline Protection

- Measure is foreshore rock dike.
- An indirect benefit area was delineated that encompasses 4,000 acres of interior marsh from the 16b-southeast measure east to a north-south oriented oil and gas canal. This area is negatively affected by saltwater intrusion and tidal exchange occurring through numerous breaches in the Freshwater Bayou Canal's bankline. Additional breaches are projected to occur in the bankline; however, interior wetlands already exhibit large-scale connectivity to the Canal. The proposed rock dike should benefit the area by reducing, but not eliminating, the hydrologic exchange occurring through the bankline breaches.
- To estimate how much the proposed rock dike would reduce interior land loss rates in the indirect benefit area, land loss trends for 306a1 (which is within the delineated indirect benefit area) were compared to an area on the proximate west bank of the canal, which has a relatively solid, un-breached bankline protected by the ME-04 rock dike. From this comparison it was determined that, following the installation of the ME-04 rock dike, the protected west bank area experienced 50% of the loss incurred by the unprotected 306a1 area during the same time period. Of course, not all of this loss reduction can be attributed to the effects of the ME-04 project, and of the part that may be attributed it is likely that the maintenance of a solid bankline was the greater contributing factor. Therefore, of the observed 50% loss rate reduction following the ME-04 project, approximately half, or 25%, was assumed to be associated with the protection of interior areas from the damaging effects of the Freshwater Bayou Canal (e.g., boat wakes, increased tidal exchange, saltwater intrusion). Furthermore, considering that a rock dike would not be as effective at reducing these effects as a solid bankline, the loss rate reduction was again reduced by half so that the proposed 16b-southeast rock dike was assumed to reduce interior land loss rates by 12.5%.
- Baseline (TY0) assumptions used information from TV-11b project.

Measure 49b1: Cameron-Creole Levee Shoreline Protection

- Measure is foreshore rock dike at marsh interface or just offshore.
- Project area limited to marsh between Calcasieu Lake and the Cameron-Creole Levee. Under the FWOP condition, erosion would not be allowed to continue past the levee toe, so that all marsh acreage would be lost by TY24.

- No Indirect benefit area associated with measure. The Cameron-Creole Watershed is already protected by the levee and it is assumed that the levee will be maintained in the future. The proposed measure would benefit the levee by protecting it from background wave-driven erosion (the measure would not prevent a hurricane-induced levee breach). Thus the measure could reduce cost of maintaining the levee.

Measure 99a: Cheniere Au Tigre Shoreline Protection

- Measure is segmented breakwaters.
- No indirect benefit area associated with measure. No existing or projected breaches.
- Use Barrier Headland Model coupled with Brackish Marsh Model. The application of the Barrier Headland Model assumed the shoreline would roll back with little loss of material, so that the shoreline template would be maintained, and transgress landward. This transgression would decrease the area of marsh, effectively converting it to Gulf of Mexico open waters. This conversion was captured with the Brackish Marsh Model.
- Baseline (TY0) assumptions used information from nearby CAT-01 State project.

Measure 113b2: Southwest Point Shoreline Protection

- Measure is foreshore rock dike.
- There are no existing or projected breaches in the shoreline. However, shoreline erosion will remove the eastern portion of the shoreline, thus increasing the width of Southwest Pass at its northern end (approximately 3,700-3,800 feet at 2075 for Intermediate SLR). A wider Pass would allow more saltwater intrusion and current flow into Vermilion Bay. Indirect benefits will be assessed using Dr. Meselhe's Chenier Plain H&H Model.
- Baseline (TY0) assumptions used information from nearby TV-18 project.

WVA ASSUMPTIONS – MARSH CREATION AND TERRACING MEASURES (used marsh models)

GENERAL:

V1 (%Marsh)

- Used corresponding subunit loss rates, rather than measure-specific loss rates, to estimate future marsh acreages (V1).
- Subunit loss rates increased using the annual wetland loss adjustment factors for Intermediate SLR.
- FWP marsh and terracing measures experience 50% of subunit loss rate, until post-construction RSLR increases water levels an additional 10 inches (TY34 for Intermediate SLR) at which point the loss rate reverts to 100% of subunit loss rate. This is based on assumption that plants would no longer be rooted in, and receiving benefits from, the mineral-based dredged material, but instead would be rooted in the largely organic, post-construction accreted material.
- Created marsh/terraces assumed 10% functional at TY1; 30% functional at TY3; and 100% functional at TY5.

V2 (%SAV)

- Existing data (WVAs, project monitoring, aerial imagery) were used to approximate TY0 (baseline) SAV coverage for the measure areas (assumed little change between existing conditions and 2025). In areas with little available information, SAV coverage estimates were supplemented with assumptions based on the suitability of local environmental conditions for SAV. SAV abundance and distribution are primarily controlled by salinity, water clarity, and water depth. Because there are several species that tolerate high salinities, coverage assumptions were based on conditions that would affect water clarity. SAV coverage was assumed to be low in water bodies with high wave action or current flow due to high turbidity and light attenuation, as well as because of direct physical erosion. In contrast, SAV coverage was assumed to be high in small, interior water bodies where there is little wave action and water movement. Water depth was also considered, and it was assumed that deeper water bodies would have less SAV coverage than shallower areas due to lower light transmission.
- FWOP – SAV coverage assumed to decrease due to increasing water depth, turbidity, and wave and current action. For marsh creation and terracing measures, SAV coverage was reduced in proportion to the amount of shallow water habitat available (i.e., in response to decreasing V4). In certain cases, however, the TY50 SAV coverage was reduced to 0% if no marsh remained in the project area for the majority of the study period.
- FWP – Marsh Creation should improve conditions for SAV because small, shallow, quiescent water bodies should form in the created marsh platform over time. Terraces should provide similar beneficial conditions within the terrace field.

  Fresh/Intermediate Marsh measures assume:
    - TY0: baseline conditions
    - TY1: 0% coverage for marsh creation (construction activities eliminate existing SAV);
    - TY3: 0% coverage for marsh creation
    - TY5: baseline conditions (or a minimum of 40% in areas with little existing SAV)
    - TY6: increase by 15% and remain at this level through TY25

- TY34: interpolated value between TY25 and TY50
- TY50: 50% of baseline (because of increasing water depths, turbidity, etc.).

Brackish/Saline Marsh Measures assume (SAV not as abundant as in lower salinity areas):

- TY0: baseline conditions
- TY1: 0% coverage for marsh creation (construction activities eliminate existing SAV); 50% of baseline for terracing (construction activities partially eliminate existing SAV)
- TY3: 0% coverage for marsh creation; 50% of baseline for terracing
- TY5: baseline conditions (or a minimum of 30% for brackish, 20% for saline marsh)
- TY6: increase by 10% and remain at this level through TY25
- TY34: interpolated value between TY25 and TY50
- TY50: 50% of baseline (because of increasing water depths, turbidity, etc.).

The assumed SAV coverage was increased or decreased in certain cases to correspond with especially high or low marsh acreage at TY50.

<u>V3 (Interspersion)</u>

- 2010 aerial imagery of project area compared against CWPPRA-developed examples of each Interspersion Class. Assumed little change between 2010 and 2025.
- FWOP – Interspersion increases as marsh is converted to open water, the rate of which is dependent on V1 land projections.
- FWP – Terrace field assumed to have Class 4 interspersion throughout study period. For marsh creation, interspersion at TY1, TY3, and TY5 is sub-optimal because the marsh platform is relatively solid with few water bodies (either unvegetated sediment or carpet marsh). Assumed interspersion for marsh creation:
    - TY0: baseline conditions
    - TY1: 100% Class 5 (supratidal)
    - TY3: 100% Class 3 (supratidal)
    - TY5: 50% Class 3; 50% Class 1 (intertidal)
    - TY6: 100% Class 1 (intertidal)
    - TY25, TY34, and TY50: based on land projections for V1.

<u>V4 (%Shallow Water)</u>

- Existing shallow water less than 1.5 feet deep was estimated from nearby surveys or other available data. In lieu of data, it was assumed that areas of recent land loss would be less than 1.5 feet deep; older loss would be deeper. Assumed little change between 2010 and 2025.
- FWOP – All existing TY0 shallow water is expected to become deep at TY50 because of Intermediate RSLR (1.9 feet over 50 years). Marsh lost between TY1 and TY50 initially becomes shallow water and converts to deep water with time. Other target years are interpolated from these assumptions.
- FWP – For marsh creation measures, any marsh lost between TY1-TY6 becomes shallow open water. Between TY6 and TY25, marsh lost during this time period becomes shallow open water, whereas 50% of marsh lost prior to TY6 becomes deep. At TY 50, marsh lost between TY6 and TY50 becomes and remains shallow open water, whereas 100% of marsh lost prior to TY6 becomes deep. For terrace measures, assumptions made are similar to FWOP except that existing TY0 shallow water is reduced 10% at TY1. This is because material to construct terraces is taken from nearby open waters, thus decreasing the amount of shallow water in the project area. Terraces are

not expected to encourage sediment deposition/accretion because of lack of sediment inputs into proposed terrace fields.

V5 (Salinity)

- Data from nearby CRMS sondes or other available gages used for existing conditions. Assumed no change between 2010 and 2025.
- FWOP and FWP salinities held constant for each measure. The Chenier Plain H&H model will provide estimates of future salinities, which will be incorporated into continuing WVA analyses.

V6 (Fish Access)

- Derived from previous WVAs, professional knowledge, and interpretation of aerial imagery. Applied standard CWPPRA ratings to structures that may affect measure. For marsh creation measures, V6 receives low rating (0.0001) at TY1 and TY3 because marsh platform is largely supratidal and containment dikes not gapped or degraded.

MEASURE-SPECIFIC:

Measure 3a1: Marsh Creation near Black Lake

- Project area straddles two subunits (2/3rd in subunit 047, 1/3rd in subunit 012), so used a weighted average of the two loss rates.
- In addition, the 1/3rd of the project area in subunit 012 is impounded and managed, which affected salinity and fish access assumptions.
- Baseline (TY0) assumptions used information from nearby CS-09 monitoring and CS-34 SF project.

Measures 3c1-5: Marsh Creation in Cameron-Creole Watershed

- Repair and optimized operation of Cameron-Creole Watershed project should help reduce current salinities and improve conditions for SAV.
- Baseline (TY0) assumptions used information from CS-54.

Measures 47a1, a2, c1, and c2: Terraces south of Grand Chenier

- Project area is under management, which intends to maintain salinities <12 ppt. Recent salinities higher due to lack of rainfall. Assumed TY0 salinity = 12 ppt.
- Baseline (TY0) assumptions used information from ME-20.

Measures 47f and h: Terraces south of Pecan Island

- Baseline (TY0) assumptions used information from ME-14.

Measures 124a-d: Marsh Creation at Mud Lake

- Baseline (TY0) assumptions used information from CS-20.

Measures 127c1-3: Marsh Creation west of Freshwater Bayou

- Baseline (TY0) assumptions used information from ME-31.

Measure 135a: Marsh Creation at Sweet Lake

- Lack of salinity data for general area. Assumed salinity is 0 based on fresh marsh classification of area.
- Baseline (TY0) assumptions used information from CS-11b.

Measures 306a1-2 and 306b1-b3: Marsh Creation east of Freshwater Bayou

- An indirect benefit area was delineated for Measure 306a1 encompassing most of the 16b-southeast indirect benefit area. To estimate how much the marsh creation would reduce interior land loss rates in the indirect benefit area, land loss trends for the 306a1 project area (used as a proxy for the indirect benefit area) were compared to an area on the proximate west bank of the canal, which has a relatively solid, un-breached bankline protected by the ME-04 rock dike. From this comparison it was determined that, following the installation of the ME-04 rock dike, the protected west bank area experienced 50% of the loss incurred by the unprotected 306a1 area during the same time period. Of course, not all of this loss reduction can be attributed to the ME-04 project, but of the part that may be attributed it is likely that the maintenance of a solid bankline was the greater contributing factor. Therefore, of the observed 50% loss rate reduction following the ME-04 project, approximately half, or 25%, was assumed to be associated with the protection of interior areas from the damaging effects of the Freshwater Bayou Canal (e.g., boat wakes, increased tidal exchange, saltwater intrusion). Considering that the proposed 306a1 measure would close the existing bankline breaches, re-establish a solid bankline, and thus eliminate the effects of the canal from the interior area, it was assumed that 306a1 would similarly reduce interior land loss rates by 25% (as compared to the 16b1-southeast rock dike which would not be as effective and thus was assumed to reduce interior loss by 12.5%).

- An indirect benefit area was also delineated for Measure 306b1. The proposed marsh creation would close a few small breaches that lead into the 306b3 marsh creation area. The nearby 306b2 marsh creation area was not considered part of the indirect benefit area because it is currently impounded and thus should be relatively unaffected by hydrologic changes due to the 306b1 measure. The same analysis as described for 306a1 was used to estimate the amount that 306b1 would reduce interior land loss rates. However, because the fronting bankline is already protected by a rock dike, and because there are fewer existing bankline breaches, it was assumed that the effects of the 306b1 measure would not as pronounced as the 306a1 measure. Thus, it was decided that the 306b1 marsh creation would reduce interior land loss by 12.5%.

Model Name	Wetland Value Assessment - Fresh/Intermediate Marsh Community Model
Model Version	
Date of Last Update	December 19, 2011

Objective of Model

The coastal marsh models were developed to determine the suitability of marsh and open water habitats in the Louisiana coastal zone. These models were designed to function at a community level and therefore attempt to define an optimal combination of habitat conditions for all fish and wildlife species utilizing coastal marsh ecosystems.

Instructions

Enter data in green cells. All green cells must contain values (including 0's) in order for the HSI calculation to compute for that year.

Always error check data following entry.

Click on variable name in column B for a brief description of the variable.

Intermediate Calculations are "over flow" calculations that were too long or complex to fit within one cell within the table.

Refer to WVA documents for model structure and background.

Notes

Enter data in units noted.

All percentages should be entered as whole numbers between 0 and 100.

Color Coding Key:

Input
Calculation
Output

TSP features:

Mermentau:	Calcasieu/Sabine
13	74a
47a1	3a1
47a2	3c1
47c1	124c
127c3	124d
306a1	5a
6b1	CR
6b2	ORP
6b3	
16b	
CR	

Summary of WVA Outputs

Feature	Net Acres	AAHU
3a1	454	252
3c1	1451	705
3c2	733	396
3c3	829	460
3c4	678	379
3c5	2189	1193
6b1	2140	678
6b2	1,583	499
6b3	1,098	326
16b-west	355	130
16b-northeast	271	87
16b-southeast(direct)	603	196
16b-southeast(indirect)	59	16
16b-southeast(total)	**662**	**212**
47a1	895	378
47a2	1218	517
47c1	1135	497
47c2	372	171
47f	736	340
47h	1151	462
49b1	251	86
99a(marsh)	48	11
99a(barrier headland)	0	0
99a (total)	**48**	**11**
113b2	431	168
124a	888	470
124b	266	123
124c	1915	1059
124d	168	104
127c1	1026	444
127c2	1131	546
127c3	735	320
135a	896	373
306a1(direct)	645	336
306a1(indirect)	98	26
306a1 (total)	**743**	**362**
306a2	1435	602
306b1(direct)	421	216
306b1(indirect)	31	9
306b1 (total)	**452**	**225**
306b2	605	276
306b3	629	292
5a(barrier headland)	26	56
99a(barrier headland)	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 47a1 Project Area: 1021

Condition: Future Without Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	9	0.18	8	0.17	5	0.15
V2	% Aquatic	20	0.28	20	0.28	10	0.19
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.20	0	0.20
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	100		100		100	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	80	1.00	77	1.00	41	0.63
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
	Emergent Marsh HSI =		0.26	EM HSI =	0.25	EM HSI =	0.24
	Open Water HSI =		0.37	OW HSI =	0.37	OW HSI =	0.30

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0.2	0.2	0.2
0	0	0

Project: SWC - 47a1 Project Area: 1021

FWOP

Variable		TY Value	49 SI	TY Value	50 SI	TY Value	SI
V1	% Emergent	0	0.10	0	0.10		
V2	% Aquatic	3	0.13	3	0.13		
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10		
	Class 2	0		0			
	Class 3	0		0			
	Class 4	0		0			
	Class 5	100		100			
V4	%OW <= 1.5ft	9	0.22	8	0.20		
V5	Salinity (ppt)	12	0.70	12	0.70		
V6	Access Value	0.25	0.33	0.25	0.33		
		EM HSI =	0.19	EM HSI =	0.19	EM HSI =	
		OW HSI =	0.22	OW HSI =	0.22	OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0

Project: SWC - 47a1 Project Area: 1021

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 47a1 Project Area: 1021

Condition: Future With Project

		TY	0	TY	1	TY	3
Variable		Value	SI	Value	SI	Value	SI
V1	% Emergent	9	0.18	13	0.22	34	0.41
V2	% Aquatic	20	0.28	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	100		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	80	1.00	100	0.60	100	0.60
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.26	EM HSI =	0.23	EM HSI =	0.35
	Open Water HSI =		0.37	OW HSI =	0.18	OW HSI =	0.20

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0.2	0	0
0	0.1	0

Project: SWC - 47a1 Project Area: 1021

FWP

		TY	5	TY	6	TY	29
Variable		Value	SI	Value	SI	Value	SI
V1	% Emergent	94	0.95	94	0.95	88	0.89
V2	% Aquatic	30	0.37	40	0.46	40	0.46
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	80	0.92
	Class 2	0		0		20	
	Class 3	50		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	84	0.92
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
		EM HSI =	0.73	EM HSI =	0.76	EM HSI =	0.73
		OW HSI =	0.42	OW HSI =	0.48	OW HSI =	0.50

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0
0	0	0
0	0	0

Project: SWC - 47a1 Project Area: 1021

FWP

		TY	30	TY	32	TY	50
Variable		Value	SI	Value	SI	Value	SI
V1	% Emergent	48	0.53	94	0.95	88	0.89
V2	% Aquatic	15	0.24	30	0.37	40	0.46
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	80	0.92
	Class 2	0		15		20	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	96	0.68	80	1.00
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
		EM HSI =	0.56	EM HSI =	0.76	EM HSI =	0.73
		OW HSI =	0.38	OW HSI =	0.45	OW HSI =	0.51

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 47a1

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	88	0.26	22.98	
1	87	0.25	22.18	22.58
25	51	0.24	12.03	407.76
49	0	0.19	0.00	135.19
50	0	0.19	0.00	0.00
Max TY=	50		AAHUs =	11.31

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	88	0.26	22.98	
1	132	0.23	30.37	26.90
3	349	0.35	122.43	144.07
5	961	0.73	702.06	747.03
6	959	0.76	732.57	717.33
29	900	0.73	656.62	15967.96
30	485	0.56	270.72	451.82
32	963	0.76	729.21	968.21
50	895	0.73	652.98	12433.99
Max TY=	50		AAHUs	629.15

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	629.15
B. Future Without Project Emergent Marsh AAHUs =	11.31
Net Change (FWP - FWOP) =	617.84

12/5/2013

AAHU CALCULATION - OPEN WATER

Project: SWC - 47a1

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	933	0.37	346.98	
1	934	0.37	347.35	347.16
25	970	0.30	287.41	7628.06
49	1021	0.22	223.68	6148.94
50	1021	0.22	222.71	223.20
Max TY=	50		AAHUs =	286.95

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	933	0.37	346.98	
1	53	0.18	9.62	150.38
3	56	0.20	11.41	21.01
5	60	0.42	25.28	36.40
6	62	0.48	29.87	27.55
29	121	0.50	60.44	1034.52
30	51	0.38	19.30	38.46
32	58	0.45	25.81	44.96
50	126	0.51	63.68	793.18
Max TY=	50		AAHUs	42.93

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	42.93
B. Future Without Project Open Water AAHUs =	286.95
Net Change (FWP - FWOP) =	-244.02

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	617.84
B. Open Water Habitat Net AAHUs =	-244.02
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	378.43

12/5/2013

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 47a2 Project Area: 1423

Condition: Future Without Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	9	0.18	9	0.18	4	0.14
V2	% Aquatic	20	0.28	20	0.28	12	0.21
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.20	0	0.20
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	100		100		100	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	80	1.00	77	1.00	41	0.63
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
	Emergent Marsh HSI =		0.26	EM HSI =	0.26	EM HSI =	0.23
	Open Water HSI =		0.37	OW HSI =	0.37	OW HSI =	0.31

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0.2	0.2	0.2
0	0	0

Project: SWC - 47a2 Project Area: 1423

FWOP

Variable		TY Value	42 SI	TY Value	50 SI	TY Value	SI
V1	% Emergent	0	0.10	0	0.10		
V2	% Aquatic	8	0.17	3	0.13		
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10		
	Class 2	0		0			
	Class 3	0		0			
	Class 4	0		0			
	Class 5	100		100			
V4	%OW <= 1.5ft	9	0.22	9	0.22		
V5	Salinity (ppt)	12	0.70	12	0.70		
V6	Access Value	0.25	0.33	0.25	0.33		
		EM HSI =	0.19	EM HSI =	0.19	EM HSI =	
		OW HSI =	0.25	OW HSI =	0.22	OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0

Project: SWC - 47a2 Project Area: 1423

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 47a2 Project Area: 1423

Condition: Future With Project

Variable		TY	0	TY	1	TY	3
		Value	SI	Value	SI	Value	SI
V1	% Emergent	9	0.18	13	0.22	34	0.41
V2	% Aquatic	20	0.28	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	100		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	80	1.00	100	0.60	100	0.60
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.26	EM HSI =	0.23	EM HSI =	0.35
	Open Water HSI =		0.37	OW HSI =	0.18	OW HSI =	0.20

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0.2	0	0
0	0.1	0

Project: SWC - 47a2 Project Area: 1423

FWP

Variable		TY	5	TY	6	TY	29
		Value	SI	Value	SI	Value	SI
V1	% Emergent	94	0.95	94	0.95	86	0.87
V2	% Aquatic	30	0.37	40	0.46	40	0.46
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	80	0.92
	Class 2	0		0		20	
	Class 3	50		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	82	0.96
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
		EM HSI =	0.73	EM HSI =	0.76	EM HSI =	0.72
		OW HSI =	0.42	OW HSI =	0.48	OW HSI =	0.50

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0
0	0	0
0	0	0

Project: SWC - 47a2 Project Area: 1423

FWP

Variable		TY	30	TY	32	TY	50
		Value	SI	Value	SI	Value	SI
V1	% Emergent	48	0.53	94	0.95	86	0.87
V2	% Aquatic	15	0.24	30	0.37	40	0.46
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	80	0.92
	Class 2	0		15		20	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	95	0.70	78	1.00
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
		EM HSI =	0.56	EM HSI =	0.76	EM HSI =	0.72
		OW HSI =	0.38	OW HSI =	0.45	OW HSI =	0.51

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 47a2

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	126	0.26	32.90	
1	124	0.26	32.38	32.64
25	60	0.23	13.76	545.55
42	0	0.19	0.00	110.44
50	0	0.19	0.00	0.00
Max TY=	50		AAHUs =	13.77

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	126	0.26	32.90	
1	185	0.23	42.56	38.04
3	488	0.35	171.19	201.56
5	1336	0.73	976.02	1039.87
6	1332	0.76	1017.50	996.78
29	1227	0.72	884.70	21858.11
30	676	0.56	377.33	616.06
32	1340	0.76	1014.68	1347.96
50	1218	0.72	878.22	17022.80
Max TY=	50		AAHUs	862.42

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	862.42
B. Future Without Project Emergent Marsh AAHUs =	13.77
Net Change (FWP - FWOP) =	848.65

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AAHU CALCULATION - OPEN WATER

Project: SWC - 47a2

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1297	0.37	482.35	
1	1299	0.37	483.09	482.72
25	1363	0.31	417.80	10827.39
42	1423	0.25	352.61	6558.44
50	1423	0.22	311.76	2657.47
Max TY=	50		AAHUs =	410.52

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1297	0.37	482.35	
1	74	0.18	13.43	209.08
3	80	0.20	16.30	29.69
5	87	0.42	36.66	52.45
6	91	0.48	43.84	40.21
29	196	0.50	98.48	1628.35
30	71	0.38	26.87	60.09
32	83	0.45	37.06	63.66
50	205	0.51	103.61	1244.56
Max TY=	50		AAHUs	66.56

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	66.56
B. Future Without Project Open Water AAHUs =	410.52
Net Change (FWP - FWOP) =	-343.96

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	848.65
B. Open Water Habitat Net AAHUs =	-343.96
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	517.37

12/5/2013

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 47c1 Project Area: 1308

Condition: Future Without Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	3 SI
V1	% Emergent	0	0.10	0	0.10	0	0.10
V2	% Aquatic	20	0.28	20	0.28	20	0.28
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10	0	0.10
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	100		100		100	
V4	%OW <= 1.5ft	58	0.85	56	0.82	52	0.77
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
	Emergent Marsh HSI =		0.19	EM HSI =	0.19	EM HSI =	0.19
	Open Water HSI =		0.35	OW HSI =	0.35	OW HSI =	0.35

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0.1

Project: SWC - 47c1 Project Area: 1308

FWOP

Variable		TY Value	25 SI	TY Value	50 SI	TY Value	SI
V1	% Emergent	0	0.10	0	0.10		
V2	% Aquatic	12	0.21	3	0.13		
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10		
	Class 2	0		0			
	Class 3	0		0			
	Class 4	0		0			
	Class 5	100		100			
V4	%OW <= 1.5ft	28	0.46	0	0.10		
V5	Salinity (ppt)	12	0.70	12	0.70		
V6	Access Value	0.25	0.33	0.25	0.33		
		EM HSI =	0.19	EM HSI =	0.19	EM HSI =	
		OW HSI =	0.29	OW HSI =	0.21	OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0

Project: SWC - 47c1 Project Area: 1308

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

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WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 47c1 Project Area: 1308

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	3 SI
V1	% Emergent	0	0.10	10	0.19	28	0.35
V2	% Aquatic	20	0.28	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	0		0		0	
	Class 5	100		100		0	
V4	%OW <= 1.5ft	58	0.85	100	0.60	100	0.60
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.19	EM HSI =	0.22	EM HSI =	0.33
	Open Water HSI =		0.35	OW HSI =	0.18	OW HSI =	0.20

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0	0	0
0.1	0.1	0

Project: SWC - 47c1 Project Area: 1308

FWP

Variable		TY Value	5 SI	TY Value	6 SI	TY Value	29 SI
V1	% Emergent	94	0.95	94	0.95	91	0.92
V2	% Aquatic	30	0.37	40	0.46	40	0.46
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	80	0.92
	Class 2	0		0		20	
	Class 3	50		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	88	0.84
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
		EM HSI =	0.73	EM HSI =	0.76	EM HSI =	0.74
		OW HSI =	0.42	OW HSI =	0.48	OW HSI =	0.49

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0
0	0	0
0	0	0

Project: SWC - 47c1 Project Area: 1308

FWP

Variable		TY Value	30 SI	TY Value	32 SI	TY Value	50 SI
V1	% Emergent	48	0.53	94	0.95	87	0.88
V2	% Aquatic	15	0.24	30	0.37	40	0.46
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	80	0.92
	Class 2	0		15		20	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	96	0.68	79	1.00
V5	Salinity (ppt)	12	0.70	12	0.70	12	0.70
V6	Access Value	0.25	0.33	0.25	0.33	0.25	0.33
		EM HSI =	0.56	EM HSI =	0.76	EM HSI =	0.73
		OW HSI =	0.38	OW HSI =	0.45	OW HSI =	0.51

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 47c1

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	4	0.19	0.76	
1	2	0.19	0.38	0.57
3	0	0.19	0.00	0.38
25	0	0.19	0.00	0.00
50	0	0.19	0.00	0.00
Max TY=	50		AAHUs =	0.02

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	4	0.19	0.76	
1	125	0.22	27.04	13.39
3	371	0.33	121.33	139.30
5	1232	0.73	900.04	905.57
6	1231	0.76	940.35	920.20
29	1188	0.74	881.89	20952.21
30	621	0.56	346.63	596.86
32	1233	0.76	933.66	1239.69
50	1135	0.73	823.23	15802.57
Max TY=	50		AAHUs	811.40

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	811.40
B. Future Without Project Emergent Marsh AAHUs =	0.02
Net Change (FWP - FWOP) =	811.38

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AAHU CALCULATION - OPEN WATER

Project: SWC - 47c1

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1304	0.35	460.41	
1	1306	0.35	458.62	459.52
3	1308	0.35	454.34	912.97
25	1308	0.29	375.05	9123.31
50	1308	0.21	275.35	8129.96
Max TY=	50		AAHUs =	372.52

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1304	0.35	460.41	
1	68	0.18	12.34	201.03
3	73	0.20	14.87	27.18
5	76	0.42	32.02	46.68
6	77	0.48	37.09	34.55
29	120	0.49	59.23	1105.76
30	65	0.38	24.60	40.86
32	75	0.45	33.38	57.76
50	173	0.51	87.44	1069.65
Max TY=	50		AAHUs	51.67

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	51.67
B. Future Without Project Open Water AAHUs =	372.52
Net Change (FWP - FWOP) =	-320.85

12/5/2013

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 127c3 Project Area: 894

Condition: Future Without Project

Variable		TY	0	TY	1	TY	22
		Value	SI	Value	SI	Value	SI
V1	% Emergent	7	0.16	7	0.16	0	0.10
V2	% Aquatic	60	0.64	60	0.64	38	0.44
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.20	0	0.10
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	100		100		0	
	Class 5	0		0		100	
V4	%OW <= 1.5ft	40	0.61	39	0.60	26	0.43
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	0.34	0.41	0.34	0.41	0.34	0.41
	Emergent Marsh HSI =		0.29	EM HSI =	0.29	EM HSI =	0.23
	Open Water HSI =		0.55	OW HSI =	0.55	OW HSI =	0.45

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0.2	0.2	0
0	0	0.1

Project: SWC - 127c3 Project Area: 894

FWOP

Variable		TY	25	TY	50	TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10	0	0.10		
V2	% Aquatic	37	0.43	10	0.19		
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10		
	Class 2	0		0			
	Class 3	0		0			
	Class 4	0		0			
	Class 5	100		100			
V4	%OW <= 1.5ft	25	0.42	7	0.19		
V5	Salinity (ppt)	4	1.00	4	1.00		
V6	Access Value	0.34	0.41	0.34	0.41		
		EM HSI =	0.23	EM HSI =	0.23	EM HSI =	
		OW HSI =	0.44	OW HSI =	0.30	OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0

Project: SWC - 127c3 Project Area: 894

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 127c3 Project Area: 894

Condition: Future With Project

Variable		TY 0 Value	SI	TY 1 Value	SI	TY 3 Value	SI
V1	% Emergent	7	0.16	12	0.21	33	0.40
V2	% Aquatic	60	0.64	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	100		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	40	0.61	100	0.60	100	0.60
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	0.34	0.41	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.29	EM HSI =	0.26	EM HSI =	0.38
	Open Water HSI =		0.55	OW HSI =	0.20	OW HSI =	0.23

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0.2	0	0
0	0.1	0

Project: SWC - 127c3 Project Area: 894

FWP

Variable		TY 5 Value	SI	TY 6 Value	SI	TY 29 Value	SI
V1	% Emergent	93	0.94	93	0.94	82	0.84
V2	% Aquatic	60	0.64	70	0.73	70	0.73
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	75	0.90
	Class 2	0		0		25	
	Class 3	50		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	80	1.00
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	0.34	0.41	0.34	0.41	0.34	0.41
		EM HSI =	0.79	EM HSI =	0.82	EM HSI =	0.76
		OW HSI =	0.59	OW HSI =	0.64	OW HSI =	0.66

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0
0	0	0
0	0	0

Project: SWC - 127c3 Project Area: 894

FWP

Variable		TY 30 Value	SI	TY 32 Value	SI	TY 50 Value	SI
V1	% Emergent	48	0.53	94	0.95	82	0.84
V2	% Aquatic	30	0.37	60	0.64	70	0.73
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	75	0.90
	Class 2	0		15		25	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	94	0.72	76	1.00
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	0.34	0.41	0.34	0.41	0.34	0.41
		EM HSI =	0.61	EM HSI =	0.82	EM HSI =	0.76
		OW HSI =	0.49	OW HSI =	0.61	OW HSI =	0.66

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0
0	0	0
0	0	0

12/5/2013

AAHU CALCULATION - OPEN WATER

Project: SWC - 127c3

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	832	0.55	457.04	
1	835	0.55	457.89	457.47
22	894	0.45	398.68	9015.16
25	894	0.44	394.18	1189.29
50	894	0.30	264.43	8232.63
Max TY=	50		AAHUs =	377.89

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	832	0.55	457.04	
1	48	0.20	9.78	188.25
3	54	0.23	12.20	21.94
5	61	0.59	35.70	47.07
6	65	0.64	41.70	38.67
29	162	0.66	107.54	1708.05
30	45	0.49	22.11	61.46
32	55	0.61	33.66	55.36
50	159	0.66	105.55	1236.68
Max TY=	50		AAHUs	67.15

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	67.15
B. Future Without Project Open Water AAHUs =	377.89
Net Change (FWP - FWOP) =	-310.74

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	562.47
B. Open Water Habitat Net AAHUs =	-310.74
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	319.91

12/5/2013

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 306a1 (direct) Project Area: 1896

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	67	0.70	67	0.70	57	0.61
V2	% Aquatic	50	0.55	50	0.55	31	0.38
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.20	0	0.20
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	100		100		100	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	90	0.80	87	0.86	56	0.82
V5	Salinity (ppt)	5.6	1.00	5.6	1.00	5.6	1.00
V6	Access Value	0.2	0.28	0.2	0.28	0.2	0.28
	Emergent Marsh HSI =		0.58	EM HSI =	0.58	EM HSI =	0.53
	Open Water HSI =		0.47	OW HSI =	0.48	OW HSI =	0.41

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0.2	0.2	0.2
0	0	0

Project: SWC - 306a1 (direct) Project Area: 1896

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	44	0.50				
V2	% Aquatic	22	0.30				
V3	Interspersion	%		%		%	
	Class 1	0	0.20				
	Class 2	0					
	Class 3	0					
	Class 4	100					
	Class 5	0					
V4	%OW <= 1.5ft	40	0.61				
V5	Salinity (ppt)	5.6	1.00				
V6	Access Value	0.2	0.28				
		EM HSI =	0.47	EM HSI =		EM HSI =	
		OW HSI =	0.36	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0.2	0	0
0	0	0

Project: SWC - 306a1 (direct) Project Area: 1896

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

12/5/2013

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 306a1 (direct) Project Area: 1896

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	3 SI
V1	% Emergent	67	0.70	36	0.42	74	0.77
V2	% Aquatic	50	0.55	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	100		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	90	0.80	100	0.60	100	0.60
V5	Salinity (ppt)	5.6	1.00	5.6	1.00	5.6	1.00
V6	Access Value	0.2	0.28	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.58	EM HSI =	0.36	EM HSI =	0.53
	Open Water HSI =		0.47	OW HSI =	0.20	OW HSI =	0.23

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0.4
0.2	0	0
0	0.1	0

Project: SWC - 306a1 (direct) Project Area: 1896

FWP

Variable		TY Value	5 SI	TY Value	6 SI	TY Value	29 SI
V1	% Emergent	93	0.94	92	0.93	78	0.80
V2	% Aquatic	50	0.55	60	0.64	60	0.64
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	30	0.70
	Class 2	0		0		60	
	Class 3	50		0		10	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	79	1.00
V5	Salinity (ppt)	5.6	1.00	5.6	1.00	5.6	1.00
V6	Access Value	0.2	0.28	0.2	0.28	0.2	0.28
		EM HSI =	0.74	EM HSI =	0.77	EM HSI =	0.68
		OW HSI =	0.50	OW HSI =	0.55	OW HSI =	0.56

Intermediate Calculations		
Interspersion		
1	1	1
0	0	0.6
0.4	0	0.4
0	0	0
0	0	0

Project: SWC - 306a1 (direct) Project Area: 1896

FWP

Variable		TY Value	30 SI	TY Value	32 SI	TY Value	50 SI
V1	% Emergent	48	0.53	94	0.95	78	0.80
V2	% Aquatic	25	0.33	50	0.55	60	0.64
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	30	0.70
	Class 2	0		15		60	
	Class 3	0		0		10	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	92	0.76	75	1.00
V5	Salinity (ppt)	5.6	1.00	5.6	1.00	5.6	1.00
V6	Access Value	0.2	0.28	0.2	0.28	0.2	0.28
		EM HSI =	0.58	EM HSI =	0.77	EM HSI =	0.68
		OW HSI =	0.43	OW HSI =	0.53	OW HSI =	0.56

Intermediate Calculations		
Interspersion		
1	1	1
0	0.6	0.6
0	0	0.4
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 306a1 (direct)

Future Without Project				
TY	Marsh Acres	x HSI	Total HUs	Cummulative HUs
0	1269	0.58	730.26	
1	1263	0.58	726.81	728.54
25	1084	0.53	575.87	15600.47
50	837	0.47	394.58	12069.04
Max TY=	50		AAHUs =	567.96

Future With Project				
TY	Marsh Acres	x HSI	Total HUs	Cummulative HUs
0	1269	0.58	730.26	
1	685	0.36	245.61	466.83
3	1412	0.53	745.61	950.15
5	1758	0.74	1301.59	2022.71
6	1749	0.77	1346.09	1323.88
29	1484	0.68	1006.41	26960.88
30	901	0.58	521.71	754.43
32	1773	0.77	1367.19	1833.07
50	1482	0.68	1005.06	21269.09
Max TY=	50		AAHUs	1111.62

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	1111.62
B. Future Without Project Emergent Marsh AAHUs =	567.96
Net Change (FWP - FWOP) =	543.66

AAHU CALCULATION - OPEN WATER

Project: SWC - 306a1 (direct)

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	627	0.47	297.63	
1	633	0.48	303.29	300.46
25	812	0.41	333.57	7691.24
50	1059	0.36	381.74	8993.16
Max TY=	50		AAHUs =	339.70

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	627	0.47	297.63	
1	103	0.20	20.98	135.64
3	120	0.23	27.11	47.97
5	138	0.50	68.57	94.06
6	147	0.55	80.88	74.65
29	412	0.56	229.74	3564.64
30	95	0.43	40.92	128.63
32	123	0.53	64.76	104.79
50	414	0.56	230.86	2633.45
Max TY=	50		AAHUs	135.68

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	135.68
B. Future Without Project Open Water AAHUs =	339.70
Net Change (FWP - FWOP) =	-204.02

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	543.66
B. Open Water Habitat Net AAHUs =	-204.02
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	335.97

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 306a1 (indirect) Project Area: 3037

Condition: Future Without Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	63	0.67	62	0.66	51	0.56
V2	% Aquatic	40	0.46	40	0.46	35	0.42
V3	Interspersion	%		%		%	
	Class 1	0	0.30	0	0.30	0	0.29
	Class 2	0		0		0	
	Class 3	50		50		45	
	Class 4	50		50		55	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	75	1.00	72	1.00	50	0.74
V5	Salinity (ppt)	5.25	1.00	5.25	1.00	5.25	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.71	EM HSI =	0.71	EM HSI =	0.64
	Open Water HSI =		0.66	OW HSI =	0.66	OW HSI =	0.61

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0.4	0.4
0.2	0.2	0.2
0	0	0

Project: SWC - 306a1 (indirect) Project Area: 3037

FWOP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Emergent	36	0.42				
V2	% Aquatic	30	0.37				
V3	Interspersion	%		%		%	
	Class 1	0	0.25				
	Class 2	0					
	Class 3	25					
	Class 4	75					
	Class 5	0					
V4	%OW <= 1.5ft	41	0.63				
V5	Salinity (ppt)	5.25	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.54	EM HSI =		EM HSI =	
		OW HSI =	0.57	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0	0
0.2	0	0
0	0	0

Project: SWC - 306a1 (indirect) Project Area: 3037

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 306a1 (indirect) Project Area: 3037

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	63	0.67	62	0.66	53	0.58
V2	% Aquatic	40	0.46	40	0.46	35	0.42
V3	Interspersion	%		%		%	
	Class 1	0	0.30	0	0.30	0	0.29
	Class 2	0		0		0	
	Class 3	50		50		45	
	Class 4	50		50		55	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	75	1.00	72	1.00	49	0.73
V5	Salinity (ppt)	5.25	1.00	5.25	1.00	5.25	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.71	EM HSI =	0.71	EM HSI =	0.65
	Open Water HSI =		0.66	OW HSI =	0.66	OW HSI =	0.61

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0.4	0.4
0.2	0.2	0.2
0	0	0

Project: SWC - 306a1 (indirect) Project Area: 3037

FWP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Emergent	40	0.46				
V2	% Aquatic	30	0.37				
V3	Interspersion	%		%		%	
	Class 1	0	0.25				
	Class 2	0					
	Class 3	27					
	Class 4	73					
	Class 5	0					
V4	%OW <= 1.5ft	37	0.58				
V5	Salinity (ppt)	5.25	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.57	EM HSI =		EM HSI =	
		OW HSI =	0.56	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0	0
0.2	0	0
0	0	0

Project: SWC - 306a1 (indirect) Project Area: 3037

FWP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 306a1 (indirect)

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	1902	0.71	1358.11	
1	1890	0.71	1338.35	1348.22
25	1562	0.64	1000.56	27978.24
50	1108	0.54	599.29	19809.57
Max TY=	50		AAHUs =	982.72

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	1902	0.71	1358.11	
1	1892	0.71	1339.76	1348.93
25	1610	0.65	1051.06	28627.55
50	1206	0.57	684.20	21546.82
Max TY=	50		AAHUs	1030.47

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	1030.47
B. Future Without Project Emergent Marsh AAHUs =	982.72
Net Change (FWP - FWOP) =	47.75

AAHU CALCULATION - OPEN WATER

Project: SWC - 306a1 (indirect)

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1136	0.66	748.02	
1	1147	0.66	755.27	751.65
25	1476	0.61	899.56	19922.41
50	1929	0.57	1094.48	25004.95
Max TY=	50		AAHUs =	913.58

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1136	0.66	748.02	
1	1145	0.66	753.95	750.99
25	1427	0.61	868.34	19523.80
50	1832	0.56	1033.01	23842.15
Max TY=	50		AAHUs	882.34

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	882.34
B. Future Without Project Open Water AAHUs =	913.58
Net Change (FWP - FWOP) =	-31.24

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	47.75

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 6b1 | Project Area: 4949

Condition: Future Without Project

Variable		TY Value (0)	SI	TY Value (1)	SI	TY Value (25)	SI
V1	% Emergent	98	0.98	97	0.97	52	0.57
V2	% Aquatic	10	0.37	10	0.37	5	0.34
V3	Interspersion	%		%		%	
	Class 1	100	1.00	100	1.00	50	0.55
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		50	
V4	%OW <= 1.5ft	70	1.00	69	0.99	37	0.58
V5	Salinity (ppt)	13	1.00	13	1.00	13	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
	Emergent Marsh HSI =		0.99	EM HSI =	0.98	EM HSI =	0.68
	Open Water HSI =		0.81	OW HSI =	0.81	OW HSI =	0.73

Intermediate Calculations

Interspersion		
1	1	1
0	0	0
0	0	0
0	0	0
0	0	0.1

Project: SWC - 6b1 | Project Area: 4949

FWOP

Variable		TY Value (50)	SI	TY Value	SI	TY Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.30				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	13	1.00				
V6	Access Value	1.00	1.00				
		EM HSI =	0.26	EM HSI =		EM HSI =	
		OW HSI =	0.64	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 6b1 | Project Area: 4949

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 6b1

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	4867	0.99	4815.78	
1	4781	0.98	4705.44	4760.54
25	2578	0.68	1755.89	74865.09
50	0	0.26	0.00	17430.94
Max=	50		AAHUs =	1941.13

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	4,867	0.99	4815.78	
1	4,824	0.98	4747.76	4781.73
25	3,648	0.83	3024.40	92536.20
50	2,140	0.62	1317.48	52932.55
Max=	50		AAHUs	3005.01

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	3005.01
B. Future Without Project Emergent Marsh AAHUs =	1941.13
Net Change (FWP - FWOP) =	1063.88

AAHU CALCULATION - OPEN WATER

Project: SWC - 6b1

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	82	0.81	66.23	
1	168	0.81	135.53	100.89
25	2371	0.73	1722.59	23004.15
50	4949	0.64	3168.76	62068.16
Max=	50		AAHUs =	1703.46

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	82	0.81	66.23	
1	125	0.81	100.84	83.54
25	1,301	0.77	1002.46	13409.91
50	2,809	0.71	2006.02	37960.40
Max=	50		AAHUs	1029.08

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	1029.08
B. Future Without Project Open Water AAHUs =	1703.46
Net Change (FWP - FWOP) =	-674.39

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	1063.88
B. Open Water Habitat Net AAHUs =	-674.39
Net Benefits= (3.5xEMAAHUs+OWAAHUs)/4.5	677.60

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 6b2 Project Area: 3691

Condition: Future Without Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	98	0.98	96	0.96	52	0.57
V2	% Aquatic	10	0.37	10	0.37	5	0.34
V3	Interspersion	%		%		%	
	Class 1	100	1.00	95	0.96	50	0.55
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		5		50	
V4	%OW <= 1.5ft	70	1.00	69	0.99	37	0.58
V5	Salinity (ppt)	13	1.00	13	1.00	13	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
	Emergent Marsh HSI =		0.99	EM HSI =	0.97	EM HSI =	0.68
	Open Water HSI =		0.81	OW HSI =	0.80	OW HSI =	0.73

Intermediate Calculations

Interspersion

1	1	1
0	0	0
0	0	0
0	0	0
0	0.1	0.1

Project: SWC - 6b2 Project Area: 3691

FWOP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.30				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	13	1.00				
V6	Access Value	1.00	1.00				
		EM HSI =	0.26	EM HSI =		EM HSI =	
		OW HSI =	0.64	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 6b2 Project Area: 3691

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 6b2 Project Area: 3691

Condition: Future With Project

Variable		TY 0 Value	SI	TY 1 Value	SI	TY 25 Value	SI
V1	% Emergent	98	0.98	97	0.97	73	0.76
V2	% Aquatic	10	0.37	10	0.37	10	0.37
V3	Interspersion	%		%		%	
	Class 1	100	1.00	95	0.96	70	0.73
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		5		30	
V4	%OW <= 1.5ft	70	1.00	69	0.99	52	0.77
V5	Salinity (ppt)	13	1.00	13	1.00	13	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
	Emergent Marsh HSI =		0.99	EM HSI =	0.98	EM HSI =	0.82
	Open Water HSI =		0.81	OW HSI =	0.80	OW HSI =	0.77

Intermediate Calculations

Interspersion

1	1	1
0	0	0
0	0	0
0	0	0
0	0.1	0.1

Project: SWC - 6b2 Project Area: 3691

FWP

Variable		TY 50 Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent	43	0.49				
V2	% Aquatic	5	0.34				
V3	Interspersion	%		%		%	
	Class 1	40	0.46				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	60					
V4	%OW <= 1.5ft	31	0.50				
V5	Salinity (ppt)	13	1.00				
V6	Access Value	1.00	1.00				
		EM HSI =	0.62	EM HSI =		EM HSI =	
		OW HSI =	0.71	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

1	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 6b2 Project Area: 3691

FWP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 6b2

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	3601	0.99	3563.10	
1	3537	0.97	3444.70	3503.74
25	1907	0.68	1298.87	55013.71
50	0	0.26	0.00	12894.03
Max=	50		AAHUs =	1428.23

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	3,601	0.99	3563.10	
1	3,569	0.98	3494.75	3528.87
25	2,699	0.82	2222.46	68064.47
50	1,583	0.62	974.56	38996.53
Max=	50		AAHUs	2211.80

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	2211.80
B. Future Without Project Emergent Marsh AAHUs =	1428.23
Net Change (FWP - FWOP) =	783.57

AAHU CALCULATION - OPEN WATER

Project: SWC - 6b2

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	90	0.81	72.69	
1	154	0.80	123.72	98.25
25	1784	0.73	1296.12	17539.27
50	3691	0.64	2363.28	46427.74
Max=	50		AAHUs =	1281.31

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	90	0.81	72.69	
1	122	0.80	98.01	85.37
25	992	0.77	764.37	10462.95
50	2,108	0.71	1505.41	28634.45
Max=	50		AAHUs	783.66

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	783.66
B. Future Without Project Open Water AAHUs =	1281.31
Net Change (FWP - FWOP) =	-497.65

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	783.57
B. Open Water Habitat Net AAHUs =	-497.65
Net Benefits= (3.5xEMAAHUs+OWAAHUs)/4.5	498.85

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 6b3 Project Area: 2587

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	97	0.97	95	0.96	51	0.56
V2	% Aquatic	10	0.37	10	0.37	5	0.34
V3	Interspersion	%		%		%	
	Class 1	0	0.60	0	0.58	0	0.35
	Class 2	100		95		50	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		5		50	
V4	%OW <= 1.5ft	70	1.00	69	0.99	37	0.58
V5	Salinity (ppt)	13	1.00	13	1.00	13	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
	Emergent Marsh HSI =		0.94	EM HSI =	0.93	EM HSI =	0.65
	Open Water HSI =		0.78	OW HSI =	0.78	OW HSI =	0.71

Intermediate Calculations		
Interspersion		
0	0	0
0.6	0.6	0.6
0	0	0
0	0	0
0	0.1	0.1

Project: SWC - 6b3 Project Area: 2587

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.30				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	13	1.00				
V6	Access Value	1.00	1.00				
		EM HSI =	0.26	EM HSI =		EM HSI =	
		OW HSI =	0.64	OW HSI =		OW HSI =	

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 6b3 Project Area: 2587

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 6b3 Project Area: 2587

Condition: Future With Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	97	0.97	96	0.96	72	0.75
V2	% Aquatic	10	0.37	10	0.37	10	0.37
V3	Interspersion	%		%		%	
	Class 1	0	0.60	0	0.58	0	0.45
	Class 2	100		95		70	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		5		30	
V4	%OW <= 1.5ft	70	1.00	69	0.99	52	0.77
V5	Salinity (ppt)	13	1.00	13	1.00	13	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
	Emergent Marsh HSI =		0.94	EM HSI =	0.93	EM HSI =	0.79
	Open Water HSI =		0.78	OW HSI =	0.78	OW HSI =	0.75

Intermediate Calculations

Interspersion

0	0	0
0.6	0.6	0.6
0	0	0
0	0	0
0	0.1	0.1

Project: SWC - 6b3 Project Area: 2587

FWP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	42	0.48				
V2	% Aquatic	5	0.34				
V3	Interspersion	%		%		%	
	Class 1	0	0.30				
	Class 2	40					
	Class 3	0					
	Class 4	0					
	Class 5	60					
V4	%OW <= 1.5ft	31	0.50				
V5	Salinity (ppt)	13	1.00				
V6	Access Value	1.00	1.00				
		EM HSI =	0.59	EM HSI =		EM HSI =	
		OW HSI =	0.70	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0.6	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 6b3 Project Area: 2587

FWP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - OPEN WATER

Project: SWC - 6b3

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	90	0.78	70.02	
1	134	0.78	103.88	86.97
25	1264	0.71	899.60	12328.97
50	2587	0.64	1656.41	32343.85
Max=	50		AAHUs =	895.20

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	90	0.78	70.02	
1	112	0.78	86.83	78.44
25	715	0.75	536.10	7536.54
50	1,489	0.70	1045.71	19925.82
Max=	50		AAHUs	550.82

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	550.82
B. Future Without Project Open Water AAHUs =	895.20
Net Change (FWP - FWOP) =	-344.38

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	517.57
B. Open Water Habitat Net AAHUs =	-344.38
Net Benefits= (3.5xEMAAHUs+OWAAHUs)/4.5	326.03

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-west | Project Area: 360

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	99	0.99	97	0.97	52	0.57
V2	% Aquatic	10	0.19	10	0.19	5	0.15
V3	Interspersion	%		%		%	
	Class 1	0	0.60	0	0.58	0	0.35
	Class 2	100		95		50	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		5		50	
V4	%OW <= 1.5ft	10	0.23	10	0.23	5	0.16
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.95	EM HSI =	0.94	EM HSI =	0.65
	Open Water HSI =		0.42	OW HSI =	0.42	OW HSI =	0.36

Intermediate Calculations

Interspersion		
0	0	0
0.6	0.6	0.6
0	0	0
0	0	0
0	0.1	0.1

Project: SWC - 16b-west | Project Area: 360

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.10				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	4	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.25	EM HSI =		EM HSI =	
		OW HSI =	0.28	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 16b-west | Project Area: 360

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-west — Project Area: 360

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	99	0.99	99	0.99	99	0.99
V2	% Aquatic	10	0.19	10	0.19	10	0.19
V3	Interspersion	%		%		%	
	Class 1	0	0.60	0	0.60	0	0.60
	Class 2	100		100		100	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	10	0.23	10	0.23	10	0.23
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.95	EM HSI =	0.95	EM HSI =	0.95
	Open Water HSI =		0.42	OW HSI =	0.42	OW HSI =	0.42

Intermediate Calculations

Interspersion

0	0	0
0.6	0.6	0.6
0	0	0
0	0	0
0	0	0

Project: SWC - 16b-west — Project Area: 360

FWP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Emergent	99	0.99				
V2	% Aquatic	10	0.19				
V3	Interspersion	%		%		%	
	Class 1	0	0.60				
	Class 2	100					
	Class 3	0					
	Class 4	0					
	Class 5	0					
V4	%OW <= 1.5ft	10	0.23				
V5	Salinity (ppt)	4	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.95	EM HSI =		EM HSI =	
		OW HSI =	0.42	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0.6	0	0
0	0	0
0	0	0
0	0	0

Project: SWC - 16b-west — Project Area: 360

FWP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - OPEN WATER

Project: SWC - 16b-west

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	5	0.42	2.11	
1	11	0.42	4.63	3.37
25	172	0.36	61.29	832.49
50	360	0.28	102.33	2101.73
Max TY=	50		AAHUs =	58.75

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	5	0.42	2.11	
1	5	0.42	2.11	2.11
25	5	0.42	2.11	50.71
50	5	0.42	2.11	52.83
Max TY=	50		AAHUs	2.11

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	2.11
B. Future Without Project Open Water AAHUs =	58.75
Net Change (FWP - FWOP) =	-56.64

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	201.93
B. Open Water Habitat Net AAHUs =	-56.64
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	130.10

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-northeast　　Project Area: 365

Condition: Future Without Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	74	0.77	73	0.76	39	0.45
V2	% Aquatic	30	0.37	30	0.37	10	0.19
V3	Interspersion	%		%		%	
	Class 1	50	0.70	50	0.70	0	0.22
	Class 2	0		0		0	
	Class 3	50		50		40	
	Class 4	0		0		0	
	Class 5	0		0		60	
V4	%OW <= 1.5ft	40	0.61	39	0.60	21	0.37
V5	Salinity (ppt)	4	1.00	4	1.00	4	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.82	EM HSI =	0.82	EM HSI =	0.56
	Open Water HSI =		0.60	OW HSI =	0.60	OW HSI =	0.40

Intermediate Calculations

Interspersion

1	1	0
0	0	0
0.4	0.4	0.4
0	0	0
0	0	0.1

Project: SWC - 16b-northeast　　Project Area: 365

FWOP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.10				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	4	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.25	EM HSI =		EM HSI =	
		OW HSI =	0.28	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 16b-northeast　　Project Area: 365

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 16b-northeast

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	271	0.82	222.89	
1	266	0.82	217.25	220.07
25	144	0.56	80.22	3442.97
50	0	0.25	0.00	821.24
Max TY=	50		AAHUs =	89.69

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	271	0.82	222.89	
1	271	0.82	222.89	222.89
25	271	0.82	222.89	5349.33
50	271	0.82	222.89	5572.22
Max TY=	50		AAHUs	222.89

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	222.89
B. Future Without Project Emergent Marsh AAHUs =	89.69
Net Change (FWP - FWOP) =	133.20

AAHU CALCULATION - OPEN WATER

Project: SWC - 16b-northeast

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	94	0.60	56.38	
1	99	0.60	59.28	57.83
25	221	0.40	89.49	1879.88
50	365	0.28	103.75	2487.95
Max TY=	50		AAHUs =	88.51

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	94	0.60	56.38	
1	94	0.60	56.38	56.38
25	94	0.60	56.38	1353.07
50	94	0.60	56.38	1409.45
Max TY=	50		AAHUs	56.38

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	56.38
B. Future Without Project Open Water AAHUs =	88.51
Net Change (FWP - FWOP) =	-32.14

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	133.20
B. Open Water Habitat Net AAHUs =	-32.14
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	87.28

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-southeast (direct) Project Area: 722

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	83	0.85	82	0.84	44	0.50
V2	% Aquatic	25	0.33	25	0.33	15	0.24
V3	Interspersion	%		%		%	
	Class 1	30	0.58	30	0.58	0	0.22
	Class 2	0		0		0	
	Class 3	70		70		40	
	Class 4	0		0		0	
	Class 5	0		0		60	
V4	%OW <= 1.5ft	50	0.74	49	0.73	26	0.43
V5	Salinity (ppt)	5.25	1.00	5.25	1.00	5.25	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.86	EM HSI =	0.85	EM HSI =	0.59
	Open Water HSI =		0.57	OW HSI =	0.57	OW HSI =	0.45

Intermediate Calculations

Interspersion

1	1	0
0	0	0
0.4	0.4	0.4
0	0	0
0	0	0.1

Project: SWC - 16b-southeast (direct) Project Area: 722

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.10				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	5.25	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.25	EM HSI =		EM HSI =	
		OW HSI =	0.28	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 16b-southeast (direct) Project Area: 722

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-southeast (direct) Project Area: 722

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Emergent	83	0.85	83	0.85	83	0.85
V2	% Aquatic	25	0.33	25	0.33	25	0.33
V3	Interspersion	%		%		%	
	Class 1	30	0.58	30	0.58	30	0.58
	Class 2	0		0		0	
	Class 3	70		70		70	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	50	0.74	50	0.74	50	0.74
V5	Salinity (ppt)	5.25	1.00	5.25	1.00	5.25	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.86	EM HSI =	0.86	EM HSI =	0.86
	Open Water HSI =		0.57	OW HSI =	0.57	OW HSI =	0.57

Intermediate Calculations

Interspersion		
1	1	1
0	0	0
0.4	0.4	0.4
0	0	0
0	0	0

Project: SWC - 16b-southeast (direct) Project Area: 722

FWP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Emergent	83	0.85				
V2	% Aquatic	25	0.33				
V3	Interspersion	%		%		%	
	Class 1	30	0.58				
	Class 2	0					
	Class 3	70					
	Class 4	0					
	Class 5	0					
V4	%OW <= 1.5ft	50	0.74				
V5	Salinity (ppt)	5.25	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.86	EM HSI =		EM HSI =	
		OW HSI =	0.57	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
1	0	0
0	0	0
0.4	0	0
0	0	0
0	0	0

Project: SWC - 16b-southeast (direct) Project Area: 722

FWP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 16b-southeast (direct)

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	603	0.86	518.62	
1	592	0.85	505.84	512.22
25	319	0.59	187.92	8035.37
50	0	0.25	0.00	1904.33
Max TY=	50		AAHUs =	209.04

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	603	0.86	518.62	
1	603	0.86	518.62	518.62
25	603	0.86	518.62	12446.90
50	603	0.86	518.62	12965.52
Max TY=	50		AAHUs	518.62

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	518.62
B. Future Without Project Emergent Marsh AAHUs =	209.04
Net Change (FWP - FWOP) =	309.58

AAHU CALCULATION - OPEN WATER

Project: SWC - 16b-southeast (direct)

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	119	0.57	67.63	
1	130	0.57	73.76	70.70
25	403	0.45	180.85	3184.85
50	722	0.28	205.23	5044.67
Max TY=	50		AAHUs =	166.00

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	119	0.57	67.63	
1	119	0.57	67.63	67.63
25	119	0.57	67.63	1623.18
50	119	0.57	67.63	1690.81
Max TY=	50		AAHUs	67.63

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	67.63
B. Future Without Project Open Water AAHUs =	166.00
Net Change (FWP - FWOP) =	-98.37

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	309.58
B. Open Water Habitat Net AAHUs =	-98.37
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	196.26

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-southeast (indirect) Project Area: 4019

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	60	0.64	60	0.64	50	0.55
V2	% Aquatic	40	0.46	40	0.46	35	0.42
V3	Interspersion	%		%		%	
	Class 1	0	0.32	0	0.32	0	0.30
	Class 2	0		0		0	
	Class 3	60		60		50	
	Class 4	40		40		50	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	75	1.00	75	1.00	25	0.42
V5	Salinity (ppt)	5.25	1.00	5.25	1.00	5.25	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.70	EM HSI =	0.70	EM HSI =	0.64
	Open Water HSI =		0.66	OW HSI =	0.66	OW HSI =	0.59

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0.4	0.4
0.2	0.2	0.2
0	0	0

Project: SWC - 16b-southeast (indirect) Project Area: 4019

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	36	0.42				
V2	% Aquatic	30	0.37				
V3	Interspersion	%		%		%	
	Class 1	0	0.27				
	Class 2	0					
	Class 3	35					
	Class 4	65					
	Class 5	0					
V4	%OW <= 1.5ft	23	0.40				
V5	Salinity (ppt)	5.25	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.54	EM HSI =		EM HSI =	
		OW HSI =	0.55	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0	0
0.2	0	0
0	0	0

Project: SWC - 16b-southeast (indirect) Project Area: 4019

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 16b-southeast (indirect) Project Area: 4019

Condition: Future With Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	60	0.64	60	0.64	51	0.56
V2	% Aquatic	40	0.46	40	0.46	35	0.42
V3	Interspersion	%		%		%	
	Class 1	0	0.32	0	0.32	0	0.30
	Class 2	0		0		0	
	Class 3	60		60		50	
	Class 4	40		40		50	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	75	1.00	75	1.00	24	0.41
V5	Salinity (ppt)	5.25	1.00	5.25	1.00	5.25	1.00
V6	Access Value	1	1.00	1	1.00	1	1.00
	Emergent Marsh HSI =		0.70	EM HSI =	0.70	EM HSI =	0.64
	Open Water HSI =		0.66	OW HSI =	0.66	OW HSI =	0.59

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0.4	0.4
0.2	0.2	0.2
0	0	0

Project: SWC - 16b-southeast (indirect) Project Area: 4019

FWP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	38	0.44				
V2	% Aquatic	30	0.37				
V3	Interspersion	%		%		%	
	Class 1	0	0.27				
	Class 2	0					
	Class 3	35					
	Class 4	65					
	Class 5	0					
V4	%OW <= 1.5ft	22	0.38				
V5	Salinity (ppt)	5.25	1.00				
V6	Access Value	1	1.00				
		EM HSI =	0.56	EM HSI =		EM HSI =	
		OW HSI =	0.55	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0	0
0.2	0	0
0	0	0

Project: SWC - 16b-southeast (indirect) Project Area: 4019

FWP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 16b-southeast (indirect)

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	2423	0.70	1692.33	
1	2409	0.70	1682.55	1687.44
25	2009	0.64	1276.73	35410.63
50	1456	0.54	790.75	25630.61
Max TY=	50		AAHUs =	1254.57

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	2423	0.70	1692.33	
1	2410	0.70	1683.25	1687.79
25	2039	0.64	1308.37	35815.21
50	1515	0.56	842.59	26700.32
Max TY=	50		AAHUs	1284.07

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	1284.07
B. Future Without Project Emergent Marsh AAHUs =	1254.57
Net Change (FWP - FWOP) =	29.49

AAHU CALCULATION - OPEN WATER

Project: SWC - 16b-southeast (indirect)

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1596	0.66	1053.29	
1	1610	0.66	1062.53	1057.91
25	2010	0.59	1178.63	27011.57
50	2562	0.55	1413.50	32481.41
Max TY=	50		AAHUs =	1211.02

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1596	0.66	1053.29	
1	1608	0.66	1061.21	1057.25
25	1980	0.59	1159.15	26755.18
50	2503	0.55	1378.57	31797.05
Max TY=	50		AAHUs	1192.19

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	1192.19
B. Future Without Project Open Water AAHUs =	1211.02
Net Change (FWP - FWOP) =	-18.83

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	29.49
B. Open Water Habitat Net AAHUs =	-18.83
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	16.07

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 3a1 Project Area: 599

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10	0	0.10	0	0.10
V2	% Aquatic	30	0.37	30	0.37	14	0.23
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10	0	0.10
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	100		100		100	
V4	%OW <= 1.5ft	35	0.55	34	0.54	17	0.32
V5	Salinity (ppt)	6	1.00	6	1.00	6	1.00
V6	Access Value	0.836	0.85	0.836	0.85	0.836	0.85
	Emergent Marsh HSI =		0.25	EM HSI =	0.25	EM HSI =	0.25
	Open Water HSI =		0.52	OW HSI =	0.52	OW HSI =	0.40

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0.1

Project: SWC - 3a1 Project Area: 599

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10				
V2	% Aquatic	0	0.10				
V3	Interspersion	%		%		%	
	Class 1	0	0.10				
	Class 2	0					
	Class 3	0					
	Class 4	0					
	Class 5	100					
V4	%OW <= 1.5ft	0	0.10				
V5	Salinity (ppt)	6	1.00				
V6	Access Value	0.836	0.85				
		EM HSI =	0.25	EM HSI =		EM HSI =	
		OW HSI =	0.27	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0.1	0	0

Project: SWC - 3a1 Project Area: 599

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 3a1 Project Area: 599

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	3 SI
V1	% Emergent	0	0.10	9	0.18	28	0.35
V2	% Aquatic	30	0.37	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	0		0		0	
	Class 5	100		100		0	
V4	%OW <= 1.5ft	35	0.55	100	0.60	100	0.60
V5	Salinity (ppt)	6	1.00	6	1.00	6	1.00
V6	Access Value	0.836	0.85	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.25	EM HSI =	0.25	EM HSI =	0.36
	Open Water HSI =		0.52	OW HSI =	0.20	OW HSI =	0.23

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0	0	0
0.1	0.1	0

Project: SWC - 3a1 Project Area: 599

FWP

Variable		TY Value	5 SI	TY Value	6 SI	TY Value	29 SI
V1	% Emergent	94	0.95	93	0.94	85	0.87
V2	% Aquatic	30	0.37	40	0.46	40	0.46
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	80	0.92
	Class 2	0		0		20	
	Class 3	50		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	82	0.96
V5	Salinity (ppt)	6	1.00	6	1.00	6	1.00
V6	Access Value	0.836	0.85	0.836	0.85	0.836	0.85
		EM HSI =	0.91	EM HSI =	0.94	EM HSI =	0.88
		OW HSI =	0.57	OW HSI =	0.65	OW HSI =	0.67

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0
0	0	0
0	0	0

Project: SWC - 3a1 Project Area: 599

FWP

Variable		TY Value	30 SI	TY Value	32 SI	TY Value	50 SI
V1	% Emergent	48	0.53	93	0.94	76	0.78
V2	% Aquatic	15	0.24	30	0.37	40	0.46
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	30	0.70
	Class 2	0		15		60	
	Class 3	0		0		10	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	91	0.78	74	1.00
V5	Salinity (ppt)	6	1.00	6	1.00	6	1.00
V6	Access Value	0.836	0.85	0.836	0.85	0.836	0.85
		EM HSI =	0.68	EM HSI =	0.93	EM HSI =	0.81
		OW HSI =	0.50	OW HSI =	0.60	OW HSI =	0.66

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0.4
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 3a1

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	0	0.25	0.00	
1	0	0.25	0.00	0.00
25	0	0.25	0.00	0.00
50	0	0.25	0.00	0.00
Max TY=	50		AAHUs =	0.00

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	0	0.25	0.00	
1	57	0.25	13.97	7.03
3	169	0.36	60.90	70.56
5	560	0.91	508.02	497.66
6	558	0.94	521.87	514.96
29	507	0.88	448.11	11144.71
30	285	0.68	194.81	314.05
32	559	0.93	519.08	691.52
50	454	0.81	367.99	7946.47
Max TY=	50		AAHUs	423.74

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	423.74
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	423.74

AAHU CALCULATION - OPEN WATER

Project: SWC - 3a1

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	599	0.52	313.91	
1	599	0.52	313.34	313.62
25	599	0.40	242.01	6664.12
50	599	0.27	163.03	5062.95
Max TY=	50		AAHUs =	240.81

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	599	0.52	313.91	
1	32	0.20	6.52	129.94
3	35	0.23	7.91	14.41
5	39	0.57	22.32	29.76
6	41	0.65	26.67	24.47
29	92	0.67	61.75	1012.81
30	30	0.50	14.96	36.57
32	40	0.60	24.13	38.74
50	145	0.66	95.40	1058.55
Max TY=	50		AAHUs	46.91

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	46.91
B. Future Without Project Open Water AAHUs =	240.81
Net Change (FWP - FWOP) =	-193.91

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	423.74
B. Open Water Habitat Net AAHUs =	-193.91
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	252.17

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 3c1 Project Area: 2215

Condition: Future Without Project

Variable		TY Value (0)	SI	TY Value (1)	SI	TY Value (20)	SI
V1	% Emergent	20	0.28	19	0.27	0	0.10
V2	% Aquatic	40	0.46	40	0.46	20	0.28
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.20	0	0.10
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	100		100		0	
	Class 5	0		0		100	
V4	%OW <= 1.5ft	70	1.00	68	0.97	35	0.55
V5	Salinity (ppt)	8.6	1.00	8.6	1.00	8.6	1.00
V6	Access Value	0.473	0.53	0.473	0.53	0.473	0.53
	Emergent Marsh HSI =		0.39	EM HSI =	0.38	EM HSI =	0.24
	Open Water HSI =		0.54	OW HSI =	0.54	OW HSI =	0.40

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0
0.2	0.2	0
0	0	0.1

Project: SWC - 3c1 Project Area: 2215

FWOP

Variable		TY Value (25)	SI	TY Value (50)	SI	TY Value	SI
V1	% Emergent	0	0.10	0	0.10		
V2	% Aquatic	10	0.19	0	0.10		
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10		
	Class 2	0		0			
	Class 3	0		0			
	Class 4	0		0			
	Class 5	100		100			
V4	%OW <= 1.5ft	17	0.32	0	0.10		
V5	Salinity (ppt)	8.6	1.00	8.6	1.00		
V6	Access Value	0.473	0.53	0.473	0.53		
		EM HSI =	0.24	EM HSI =	0.24	EM HSI =	
		OW HSI =	0.33	OW HSI =	0.24	OW HSI =	

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0.1	0.1	0

Project: SWC - 3c1 Project Area: 2215

FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Brackish Marsh

Project: SWC - 3c1　　　　Project Area: 2215

Condition: Future With Project

Variable		TY 0 Value	SI	TY 1 Value	SI	TY 3 Value	SI
V1	% Emergent	20	0.28	17	0.25	41	0.47
V2	% Aquatic	40	0.46	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	100		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	70	1.00	100	0.60	100	0.60
V5	Salinity (ppt)	8.6	1.00	8.6	1.00	8.6	1.00
V6	Access Value	0.473	0.53	0.0001	0.10	0.0001	0.10
	Emergent Marsh HSI =		0.39	EM HSI =	0.28	EM HSI =	0.41
	Open Water HSI =		0.54	OW HSI =	0.20	OW HSI =	0.23

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0.2	0	0
0	0.1	0

Project: SWC - 3c1　　　　Project Area: 2215

FWP

Variable		TY 5 Value	SI	TY 6 Value	SI	TY 29 Value	SI
V1	% Emergent	89	0.90	88	0.89	59	0.63
V2	% Aquatic	40	0.46	50	0.55	50	0.55
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	0	0.56
	Class 2	0		0		80	
	Class 3	50		0		20	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	77	1.00
V5	Salinity (ppt)	8.6	1.00	8.6	1.00	8.6	1.00
V6	Access Value	0.473	0.53	0.473	0.53	0.473	0.53
		EM HSI =	0.81	EM HSI =	0.84	EM HSI =	0.64
		OW HSI =	0.55	OW HSI =	0.61	OW HSI =	0.61

Intermediate Calculations

Interspersion

1	1	0
0	0	0.6
0.4	0	0.4
0	0	0
0	0	0

Project: SWC - 3c1　　　　Project Area: 2215

FWP

Variable		TY 30 Value	SI	TY 32 Value	SI	TY 50 Value	SI
V1	% Emergent	48	0.53	92	0.93	66	0.69
V2	% Aquatic	20	0.28	40	0.46	50	0.55
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	20	0.66
	Class 2	0		15		70	
	Class 3	0		0		10	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	88	0.84	72	1.00
V5	Salinity (ppt)	8.6	1.00	8.6	1.00	8.6	1.00
V6	Access Value	0.473	0.53	0.473	0.53	0.473	0.53
		EM HSI =	0.63	EM HSI =	0.85	EM HSI =	0.69
		OW HSI =	0.47	OW HSI =	0.58	OW HSI =	0.62

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0.4
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 3c1

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	450	0.39	173.33	
1	428	0.38	162.18	167.74
20	0	0.24	0.00	1347.43
25	0	0.24	0.00	0.00
50	0	0.24	0.00	0.00
Max TY=	50		AAHUs =	30.30

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	450	0.39	173.33	
1	383	0.28	107.66	139.33
3	899	0.41	369.46	454.78
5	1982	0.81	1600.93	1827.15
6	1956	0.84	1635.82	1618.50
29	1317	0.64	847.97	28092.16
30	1052	0.63	667.88	757.52
32	2043	0.85	1733.73	2331.00
50	1451	0.69	1002.22	24343.11
Max TY=	50		AAHUs	1191.27

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	1191.27
B. Future Without Project Emergent Marsh AAHUs =	30.30
Net Change (FWP - FWOP) =	1160.97

AAHU CALCULATION - OPEN WATER

Project: SWC - 3c1

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1765	0.54	953.75	
1	1787	0.54	962.26	958.01
20	2215	0.40	891.35	17793.66
25	2215	0.33	724.55	4039.74
50	2215	0.24	531.49	15700.41
Max TY=	50		AAHUs =	769.84

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1765	0.54	953.75	
1	135	0.20	27.50	399.17
3	184	0.23	41.58	68.72
5	233	0.55	127.63	163.95
6	259	0.61	158.69	142.88
29	898	0.61	547.55	8129.04
30	111	0.47	52.48	282.05
32	172	0.58	100.33	150.56
50	764	0.62	471.50	5086.46
Max TY=	50		AAHUs	288.46

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	288.46
B. Future Without Project Open Water AAHUs =	769.84
Net Change (FWP - FWOP) =	-481.38

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	1160.97
B. Open Water Habitat Net AAHUs =	-481.38
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	704.76

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 124c | Project Area: 2642

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	28	0.35	27	0.34	20	0.28
V2	% Aquatic	10	0.37	10	0.37	5	0.34
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.20	0	0.18
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	100		100		80	
	Class 5	0		0		20	
V4	%OW <= 1.5ft	85	0.88	82	0.95	47	0.70
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00
V6	Access Value	0.80	0.82	0.80	0.82	0.80	0.82
	Emergent Marsh HSI =		0.47	EM HSI =	0.47	EM HSI =	0.42
	Open Water HSI =		0.66	OW HSI =	0.67	OW HSI =	0.63

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0.2	0.2	0.2
0	0	0.1

Project: SWC - 124c | Project Area: 2642

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	9	0.18				
V2	% Aquatic	2	0.31				
V3	Interspersion	%		%		%	
	Class 1	0	0.17				
	Class 2	0					
	Class 3	0					
	Class 4	70					
	Class 5	30					
V4	%OW <= 1.5ft	20	0.36				
V5	Salinity (ppt)	17	1.00				
V6	Access Value	0.80	0.82				
		EM HSI =	0.34	EM HSI =		EM HSI =	
		OW HSI =	0.60	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0.2	0	0
0.1	0	0

Project: SWC - 124c | Project Area: 2642

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 124c   Project Area: 2642

Condition: Future With Project

Variable		TY	0	TY	1	TY	3
		Value	SI	Value	SI	Value	SI
V1	% Emergent	28	0.35	21	0.29	47	0.52
V2	% Aquatic	10	0.37	0	0.30	0	0.30
V3	Interspersion	%		%		%	
	Class 1	0	0.20	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	100		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	85	0.88	100	0.50	100	0.50
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00
V6	Access Value	0.80	0.82	0.00	0.10	0.00	0.10
	Emergent Marsh HSI =		0.47	EM HSI =	0.29	EM HSI =	0.42
	Open Water HSI =		0.66	OW HSI =	0.23	OW HSI =	0.25

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0.4
0.2	0	0
0	0.1	0

Project: SWC - 124c   Project Area: 2642

FWP

Variable		TY	5	TY	6	TY	29
		Value	SI	Value	SI	Value	SI
V1	% Emergent	93	0.94	93	0.94	82	0.84
V2	% Aquatic	20	0.44	30	0.51	30	0.51
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	70	0.88
	Class 2	0		0		30	
	Class 3	50		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.50	100	0.50	80	1.00
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00
V6	Access Value	0.80	0.82	0.80	0.82	0.80	0.82
		EM HSI =	0.89	EM HSI =	0.93	EM HSI =	0.86
		OW HSI =	0.70	OW HSI =	0.74	OW HSI =	0.77

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0
0	0	0
0	0	0

Project: SWC - 124c   Project Area: 2642

FWP

Variable		TY	30	TY	32	TY	50
		Value	SI	Value	SI	Value	SI
V1	% Emergent	48	0.53	94	0.95	82	0.84
V2	% Aquatic	10	0.37	20	0.44	30	0.51
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	70	0.88
	Class 2	0		15		30	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.50	94	0.65	76	1.00
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00
V6	Access Value	0.80	0.82	0.80	0.82	0.80	0.82
		EM HSI =	0.68	EM HSI =	0.93	EM HSI =	0.86
		OW HSI =	0.69	OW HSI =	0.73	OW HSI =	0.77

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 124c

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	734	0.47	346.13	
1	726	0.47	337.63	341.87
25	523	0.42	217.57	6622.59
50	248	0.34	83.18	3666.93
Max=	50		AAHUs =	212.63

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	734	0.47	346.13	
1	542	0.29	159.70	247.26
3	1248	0.42	529.91	659.03
5	2462	0.89	2200.45	2540.50
6	2451	0.93	2272.32	2236.45
29	2158	0.86	1849.70	47324.72
30	1255	0.68	857.50	1327.43
32	2479	0.93	2294.33	3052.99
50	2163	0.86	1853.99	37270.04
Max=	50		AAHUs	1893.17

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	1893.17
B. Future Without Project Emergent Marsh AAHUs =	212.63
Net Change (FWP - FWOP) =	1680.54

AAHU CALCULATION - OPEN WATER

Project: SWC - 124c

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1908	0.66	1262.66	
1	1916	0.67	1278.60	1270.63
25	2119	0.63	1342.25	31477.70
50	2394	0.60	1431.43	34711.60
Max=	50		AAHUs =	1349.20

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	1,908	0.66	1262.66	
1	141	0.23	31.73	518.58
3	160	0.25	39.56	71.15
5	180	0.70	125.43	161.99
6	191	0.74	141.73	133.50
29	484	0.77	372.77	5885.15
30	132	0.69	91.51	227.63
32	163	0.73	118.29	209.46
50	479	0.77	368.92	4342.73
Max=	50		AAHUs	231.00

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	231.00
B. Future Without Project Open Water AAHUs =	1349.20
Net Change (FWP - FWOP) =	-1118.19

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	1680.54
B. Open Water Habitat Net AAHUs =	-1118.19
Net Benefits= (3.5xEMAAHUs+OWAAHUs)/4.5	1058.60

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 124d

Project Area: 607

Condition: Future Without Project

Variable		TY	0	TY	1	TY	25
		Value	SI	Value	SI	Value	SI
V1	% Emergent	74	0.77	74	0.77	64	0.68
V2	% Aquatic	10	0.37	10	0.37	7	0.35
V3	Interspersion	%		%		%	
	Class 1	0	0.40	0	0.40	0	0.40
	Class 2	0		0		0	
	Class 3	100		100		100	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	85	0.88	82	0.95	57	0.83
V5	Salinity (ppt)	20	1.00	20	1.00	20	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
	Emergent Marsh HSI =		0.79	EM HSI =	0.79	EM HSI =	0.74
	Open Water HSI =		0.75	OW HSI =	0.76	OW HSI =	0.74

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0.4	0.4
0	0	0
0	0	0

Project: SWC - 124d

Project Area: 607

FWOP

Variable		TY	50	TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	50	0.55				
V2	% Aquatic	5	0.34				
V3	Interspersion	%		%		%	
	Class 1	0	0.34				
	Class 2	0					
	Class 3	70					
	Class 4	30					
	Class 5	0					
V4	%OW <= 1.5ft	47	0.70				
V5	Salinity (ppt)	20	1.00				
V6	Access Value	1.00	1.00				
		EM HSI =	0.65	EM HSI =		EM HSI =	
		OW HSI =	0.72	OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0	0
0.2	0	0
0	0	0

Project: SWC - 124d

Project Area: 607

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion	%		%		%	
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
V6	Access Value						
		EM HSI =		EM HSI =		EM HSI =	
		OW HSI =		OW HSI =		OW HSI =	

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: SWC - 124d   Project Area: 607

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	3 SI
V1	% Emergent	74	0.77	39	0.45	79	0.81
V2	% Aquatic	10	0.37	0	0.30	0	0.30
V3	Interspersion	%		%		%	
	Class 1	0	0.40	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	100		0		100	
	Class 4	0		0		0	
	Class 5	0		100		0	
V4	%OW <= 1.5ft	85	0.88	100	0.50	100	0.50
V5	Salinity (ppt)	20	1.00	20	1.00	20	1.00
V6	Access Value	1.00	1.00	0.00	0.10	0.00	0.10
	Emergent Marsh HSI =		0.79	EM HSI =	0.36	EM HSI =	0.53
	Open Water HSI =		0.75	OW HSI =	0.23	OW HSI =	0.25

Intermediate Calculations

Interspersion

0	0	0
0	0	0
0.4	0	0.4
0	0	0
0	0.1	0

Project: SWC - 124d   Project Area: 607

FWP

Variable		TY Value	5 SI	TY Value	6 SI	TY Value	29 SI
V1	% Emergent	93	0.94	92	0.93	78	0.80
V2	% Aquatic	20	0.44	30	0.51	30	0.51
V3	Interspersion	%		%		%	
	Class 1	50	0.70	100	1.00	30	0.70
	Class 2	0		0		60	
	Class 3	50		0		10	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.50	100	0.50	79	1.00
V5	Salinity (ppt)	20	1.00	20	1.00	20	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
		EM HSI =	0.93	EM HSI =	0.96	EM HSI =	0.85
		OW HSI =	0.78	OW HSI =	0.83	OW HSI =	0.84

Intermediate Calculations

Interspersion

1	1	1
0	0	0.6
0.4	0	0.4
0	0	0
0	0	0

Project: SWC - 124d   Project Area: 607

FWP

Variable		TY Value	30 SI	TY Value	32 SI	TY Value	50 SI
V1	% Emergent	48	0.53	94	0.95	78	0.80
V2	% Aquatic	10	0.37	20	0.44	30	0.51
V3	Interspersion	%		%		%	
	Class 1	100	1.00	85	0.94	30	0.70
	Class 2	0		15		60	
	Class 3	0		0		10	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.50	92	0.70	75	1.00
V5	Salinity (ppt)	20	1.00	20	1.00	20	1.00
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
		EM HSI =	0.71	EM HSI =	0.96	EM HSI =	0.85
		OW HSI =	0.77	OW HSI =	0.81	OW HSI =	0.84

Intermediate Calculations

Interspersion

1	1	1
0	0.6	0.6
0	0	0.4
0	0	0
0	0	0

AAHU CALCULATION - EMERGENT MARSH

Project: SWC - 124d

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	448	0.79	354.99	
1	446	0.79	353.41	354.20
25	387	0.74	284.60	7642.65
50	307	0.65	198.21	6005.19
Max=	50		AAHUs =	280.04

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	448	0.79	354.99	
1	236	0.36	85.66	205.16
3	481	0.53	254.65	326.72
5	563	0.93	523.38	767.09
6	560	0.96	536.26	529.83
29	474	0.85	401.97	10753.57
30	288	0.71	203.53	298.37
32	568	0.96	546.20	725.94
50	475	0.85	402.82	8509.47
Max=	50		AAHUs	442.32

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	442.32
B. Future Without Project Emergent Marsh AAHUs =	280.04
Net Change (FWP - FWOP) =	162.28

AAHU CALCULATION - OPEN WATER

Project: SWC - 124d

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	159	0.75	119.88	
1	161	0.76	122.28	121.08
25	220	0.74	163.06	3428.38
50	300	0.72	216.15	4746.93
Max=	50		AAHUs =	165.93

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	159	0.75	119.88	
1	33	0.23	7.43	52.55
3	39	0.25	9.64	17.03
5	44	0.78	34.24	43.00
6	47	0.83	38.86	36.53
29	133	0.84	111.94	1729.34
30	30	0.77	23.12	66.31
32	39	0.81	31.62	54.62
50	132	0.84	111.10	1275.82
Max=	50		AAHUs	65.50

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	65.50
B. Future Without Project Open Water AAHUs =	165.93
Net Change (FWP - FWOP) =	-100.42

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	162.28
B. Open Water Habitat Net AAHUs =	-100.42
Net Benefits= (3.5xEMAAHUs+OWAAHUs)/4.5	103.90

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Barrier Headland

Project: SWC - 5a Acres: 426

Condition: Future Without Project

Variable		TY Value	0	TY Value	1 SI	TY Value	25 SI
V1	% Dune	10	0.70	10	0.70	5	0.40
V2	% Supratidal	90	0.83	90	0.83	95	0.67
V3	% Vegetative Cover	35	0.56	35	0.56	25	0.43
V4	% Woody Cover	5	0.40	5	0.40	5	0.40
V5	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI =	0.704	HSI =	0.704	HSI =	0.574

Project: SWC - 5a Acres: 426
FWOP

Variable		TY Value	29 SI	TY Value	32 SI	TY Value	50 SI
V1	% Dune	0	0.10	0	0.10	0	0.10
V2	% Supratidal	100	0.50	0	0.10	0	0.10
V3	% Vegetative Cover	20	0.36	0	0.10	0	0.10
V4	% Woody Cover	5	0.40	0	0.10	0	0.10
V5	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI =	0.455	HSI =	0.262	HSI =	0.262

Project: SWC - 5a Acres: 426
FWOP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Dune						
V2	% Supratidal						
V3	% Vegetative Cover						
V4	% Woody Cover						
V5	Beach/surf Zone						
		HSI =		HSI =		HSI =	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Barrier Headland

Project: SWC - 5a   Acres: 426

Condition: Future With Project

Variable		TY Value	0 SI	TY Value	1 SI	TY Value	25 SI
V1	% Dune	10	0.70	10	0.70	5	0.40
V2	% Supratidal	90	0.83	90	0.83	95	0.67
V3	% Vegetative Cover	35	0.56	35	0.56	35	0.56
V4	% Woody Cover	5	0.40	5	0.40	5	0.40
V5	Beach/surf Zone	1	1.00	3	0.90	3	0.90
		HSI =	0.704	HSI =	0.686	HSI =	0.579

Project: SWC - 5a   Acres: 426

FWP

Variable		TY Value	50 SI	TY Value	SI	TY Value	SI
V1	% Dune	0	0.10				
V2	% Supratidal	100	0.50				
V3	% Vegetative Cover	20	0.36				
V4	% Woody Cover	5	0.40				
V5	Beach/surf Zone	3	0.90				
		HSI =	0.437	HSI =		HSI =	

Project: SWC - 5a   Acres: 426

FWP

Variable		TY Value	SI	TY Value	SI	TY Value	SI
V1	% Dune						
V2	% Supratidal						
V3	% Vegetative Cover						
V4	% Woody Cover						
V5	Beach/surf Zone						
		HSI =		HSI =		HSI =	

AAHU CALCULATION

Project: SWC - 5a

Future Without Project			Total	Cummulative
TY	**Acres**	**x HSI**	**HUs**	**HUs**
0	426	0.704	300.11	
1	414	0.704	291.66	295.89
25	90	0.574	51.64	3950.22
29	33	0.455	15.01	128.78
32	0	0.262	0.00	19.33
50	0	0.262	0.00	0.00
Max TY=	50		AAHUs =	87.88

Future With Project			Total	Cummulative
TY	**Acres**	**x HSI**	**HUs**	**HUs**
0	426	0.704	300.11	
1	420	0.686	288.33	294.20
25	247	0.579	143.06	5102.40
50	26	0.437	11.36	1799.10
Max TY=	50		AAHUs	143.91

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHUs =	143.91
B. Future Without Project AAHUs =	87.88
Net Change (FWP - FWOP) =	56.03

SOUTHWEST COASTAL LOUISIANA
REVISED INTEGRATED DRAFT FEASIBILITY REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

ANNEX U

Glossary

1. GLOSSARY

A

Acceptability. Adequate to satisfy a need, requirement, or standard. One of the USACE requirements for a project. (LCA Ecosystem Restoration Study, glossary).

Activity. A nonstructural action, (Planning Guidance Notebook, E-3).

Adaptive Management. An interdisciplinary approach acknowledging our insufficient information basis for decision-making; that uncertainty and change in managed resources are inevitable; and that new uncertainties will emerge. An iterative approach that includes monitoring and involves scientists, engineers and other who provide information and recommendations that are incorporated into management actions; results are then followed with further research, recommendations and management actions, and so on. (LCA Ecosystem Restoration Study, glossary).

Air Quality Determination. The Louisiana Department of Environmental Quality ensures that projects do not adversely affect air quality through this determination as a requirement of the Clean Air Act (LCA Ecosystem Restoration Study, glossary).

Alternative Formulation. Creating alternatives.

Alternative Formulation Briefing (AFB). Purpose is to confirm that the plan formulation and selection process, the tentatively selected plan, and the definition of Federal and non-Federal responsibilities are consistent with applicable laws, statutes, Executive Orders, regulations and current policy guidance. The goal is to obtain a HQUSACE endorsement of the tentatively selected plan, to identify and resolve any legal or policy concerns that would otherwise delay or preclude Washington-level approval of the draft report, and to obtain HQUSACE approval to release the draft report and NEPA document to the public concurrent with the HQUSACE policy compliance review of the draft report. (Planning Guidance Notebook, H-7).

Alternative Plan is a set of one or more management measures functioning together to address one or more planning objectives subject to planning constraints (Planning Guidance Notebook, 2-4).

Amplitude- The maximum absolute value of a periodically varying quantity (LCA Ecosystem Restoration Study, glossary).

Anoxia- Absence of oxygen (LCA Ecosystem Restoration Study, glossary).

Anthropogenic- Caused by human activity (LCA Ecosystem Restoration Study, glossary).

Aquaculture- The science and business of farming marine or freshwater food fish or shellfish, such as oysters and crawfish, under controlled conditions (LCA Ecosystem Restoration Study, glossary).

Astronomical Tides- Daily tides controlled by the moon, as opposed to wind-generated tides.

Average Annual Habitat Unit (AAHU)- represents a numerical combination of habitat quality and quantity (acres) existing at any given point in time. The habitat unites resulting from the future without- and future with-project scenarios are annualized, averaged over the project life, to determine Average Annual Habitat Units (AAHUs) (LCA Ecosystem Restoration Study, glossary).

B

Bathymetry- is the under water equivalent of Hypsometry, which is the measurement of land elevation relative to sea level. Originally, bathymetry referred to the measurement of ocean depth (Online Encyclopedia).

Benefits- Valuation of positive performance measures (LCA Ecosystem Restoration Study, glossary).

Benthic- Living on or in sea, lake, or stream bottoms (LCA Ecosystem Restoration Study, glossary).

Biomass- The total mass of living matter (plant and animal) within a giving unit of environmental area (LCA Ecosystem Restoration Study, glossary).

Bottomland Hardwood Forest- Low-lying forested wetlands found along streams and rivers (LCA Ecosystem Restoration Study, glossary).

Brackish Marsh (BRM)- Intertidal plant community typically found in the area of the estuary where salinity ranges between 4-15ppt (LCA Ecosystem Restoration Study, glossary).

Brackish water- is water that has more salinity than fresh water, but not as much as seawater. It may result from mixing of seawater with fresh water, as in estuaries, or it may occur in brackish fossil aquifers; it contains between 0.5 to 30 grams of salt per litre—more often expressed as 0.5 to 30 parts per thousand (ppt or ‰). Thus, brackish covers a range of salinity regimes and is not considered a precisely defined condition. It is characteristic of many brackish surface waters that their salinity can vary considerably over space and/or time (Webster Encyclopedia Online).

C

Chief's Report- the report that approves or modifies the report and is the report that is transmitted to the Secretary Army for delivery to congress (Troy).

Chenier Plan- Western part of coastal Louisiana with little influence from Mississippi and Atchafalaya rivers characterized by chenier ridges (LCA Ecosystem Restoration Study, glossary).

Cheniers- elevated inland ridges parallel to the gulf shore; blocked drainage and salt water inflow from the Gulf of Mexico, resulting in the development of large freshwater basins on the landward side of the ridges (ER Study, 1-14).

Clean Water Act Section 404 (b) (1)- There are several sections of this Act which pertain to regulating impacts to wetland. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of this Act and specifically under Section 404 (Discharges of Dredge or Fill Material) of the Act. (LCA Ecosystem Restoration Study, glossary).

Coastal Zone Consistency Determination- The US Environmental Protection Agency reviews plans for activities in the coastal zone to ensure they are consistent with Federally approved State Coastal Management Programs under Section 307(c)(3)(B) of the Coastal Zone Management Act (LCA Ecosystem Restoration Study, glossary).

Coast wide Plan- Combination of alternative plans assembled to address an objective or set of objectives across the entire Louisiana Coast. (LCA Ecosystem Restoration Study, glossary).

Coast wide Framework- Combination of plan components assembled to address an objective or set of objectives across the entire Louisiana Coast.

Collocated Team- A collection of scientists and professionals from the US Army Corps of Engineers, US Fish and Wildlife Service, NOAA Fisheries, Natural Resources Conservation Service, US Geological Survey, US Environmental Protection Agency, Louisiana Department of Natural Resources, and Louisiana Department of Wildlife and Fisheries that are located at the USACE-MVN office and work together on the LCA Plan (LCA Ecosystem Restoration Study, glossary).

Compaction of Holocene Deposits- Deltaic mud that packs down under its own weight (LCA Ecosystem Restoration Study, glossary).

Comparison of Alternatives- Describe how the plans in the final array of alternatives compare in meeting the planning objectives and constraints. Cite key risks and uncertainties associated with the plans, and explain how these factors have been treated. Identify key tradeoffs among the alternatives (could be among outputs and effects, or against risks and uncertainties), (Planning Guidance Notebook, H-45).

Completeness- The ability of a plan to address all of the objectives. One of the USACE four requirements for a project (LCA Ecosystem Restoration Study, glossary).

Comprehensive Plan- Same as Coast wide Plan (LCA Ecosystem Restoration Study, glossary).

Comprehensive Study -characterizes, measures, and evaluates a particular water resources problem or opportunity across a broad area or region. Typically, the focus of comprehensive studies is water resources problems related to the Corps main mission areas (flood damage reduction, ecosystem restoration or navigation).

Conditional Authorization- authorization for implementation of a project subject to approval of the project feasibility-level decision document by the Assistant Secretary of the Army for Civil Works (LCA Ecosystem Restoration Study, glossary).

Congressional Authorization- authorization for investigation to prepare necessary feasibility-level report to be recommended for authorization of potential future project construction by Congress (LCA Ecosystem Restoration Study, glossary).

Connectivity- Property of ecosystems that allows for exchange of resources and organisms throughout the broader ecosystem (LCA Ecosystem Restoration Study, glossary).

Constraint. A limitation or restriction on plans. Planning constraints may not be absolute restrictions but rather something to minimize or avoid.

Continental Shelf- The edge of the continent under gulf waters; the shallow Gulf of Mexico fringing the coast (LCA Ecosystem Restoration Study, glossary).

Continuing Authorities Program (CAP) -means a group of 10 legislative authorities under which the Secretary of the Army, acting through the Chief of Engineers, is authorized to plan, design, and implement certain types of water resources projects without additional project specific congressional authorization. Table F-2 lists the CAP authorities and their project purposes (Planning Guidance Notebook, F-3).

Control Structure- A gate, lock, or weir that controls the flow of water (LCA Ecosystem Restoration Study, glossary).

Crevasse- A breach or gap in the levee or embankment of a river (natural or manmade), through which floodwaters flow (LCA Ecosystem Restoration Study, glossary).

Cumulative Impacts- The combined effect of all direct and indirect impacts to a resource over time (LCA Ecosystem Restoration Study, glossary).

D

Damage. This term from the Congressional language is interpreted to mean damage to real property.

Datum- A point, line, or surface used as a reference, as in surveying, mapping, or geology (LCA Ecosystem Restoration Study, glossary).

Deciduous Forest- Forest composed mostly of trees that lose their leaves in the winter (LCA Ecosystem Restoration Study, glossary).

Decision document- means the consolidated documentation of technical and policy analyses, findings, and conclusions upon which the District Commander bases the recommendation to the Major Subordinate Command Commander to approve the recommended project for implementation. The decision document will be used to support the PCA. Minimum decision document requirements are listed in Section II, paragraph F-10.f. (2) of this Appendix (Planning Guidance Notebook, F-3).

Decomposition- Breakdown or decay of organic materials (LCA Ecosystem Restoration Study, glossary).

Degradation Phase- The phase of the deltaic cycle when sediments are no longer delivered to a delta, and it experience erosion, dieback, or breakup of marshes. (LCA Ecosystem Restoration Study, glossary).

Delineate –to define

Deltaic cycle- is a dynamic and episodic process alternating between periods of "delta-building" with seaward advancement (progradation) of deltas and the subsequent landward retreat (degradation). As deltas are abandoned, the seaward edges are reworked into barrier headlands and barrier islands. Subsequently, the wetland complex behind headlands and islands, without a significant source of sediment and nutrients, eventually becomes submerged by marine waters (ER Study, 1-7). Initiated when a River comes into contact with bodies of water, thus, decreasing the velocity of water in the River which decreases sediment delivery (ER Study, 1-8).

Deltaic Deposits- Mud and sand deposited at the mouth of a river (LCA Ecosystem Restoration Study, glossary).

Deltaic Plain- The land formed and reworked as the Mississippi River switched channels in the eastern part of the Louisiana coastal area.

Demersal- Dwelling at or near the bottom of a body of water (ex demersal fish) (LCA Ecosystem Restoration Study, glossary).

Detritus- The remains of plant material that has been destroyed or broken up (LCA Ecosystem Restoration Study, glossary).

Design and implementation phase -means the phase of the project during which all post feasibility phase activities (except for operation, maintenance, repair, rehabilitation, or replacement activities) are performed including negotiation and execution of the PCA, final design, preparation of contract plans and specifications, construction, and any other activities required to construct or implement the approved project (Planning Guidance Notebook, F-3).

Dewatering- The process of dredged sediments compacting while losing water after being deposited (LCA Ecosystem Restoration Study, glossary).

Discharge- The volume of fluid passing a point per unit of time, commonly expressed in cubic feet per second, millions of gallons per day, or gallons per minute (LCA Ecosystem Restoration Study, glossary).

Dissolved Oxygen- Oxygen dissolved in water, available for respiration by aquatic organisms. One of the most important indicators of the condition of a water body (LCA Ecosystem Restoration Study, glossary).

Direct Impacts- Those effects that result from the initial construction of a measure (ex marsh destroyed during the dredging of a canal). Contrast with "Indirect Impacts" (LCA Ecosystem Restoration Study, glossary).

Diurnal- Relating to or occurring in a 24-hour period; daily (LCA Ecosystem Restoration Study, glossary).

Diversion- A turning aside or alteration of the natural course or flow of water. In coastal restoration this usually consists of such actions as channeling water through a canal, pipe, or conduit to introduce water and water-borne resources into a receiving area (LCA Ecosystem Restoration Study, glossary).

Drainage Basins- includes coastal zones and lake shores, as well as riverine drainage areas or any portion there of located within the boundaries of a state (Planning Guidance Notebook, G-95).

Drainage projects -are usually undertaken in rural areas to increase agricultural outputs. Some portions of drainage improvements may be considered flood damage reduction measures in accordance with Section 2 of the Flood Control Act of 1944. The typical drainage system consists of drainage ditches, dikes, and related work (Planning Guidance Notebook, 3-10).

Dredged material embankments (Spoil Banks, Side-cast Banks, Excavated Material Banks) –dredged material removed from canals and piled in a linear mound along the edge of canals (LCA Ecosystem Restoration Study, glossary).

Dredging- The removal of sediment; used to create wetlands often (Online).

Dynamic- Characterized by continuous change and activity (LCA Ecosystem Restoration Study, glossary).

E

Ecological- Refers to the relationship between living things and their environment (LCA Ecosystem Restoration Study, glossary).

Economic- Of or relating to the production, development, and management of material wealth, as of a country, household, or business enterprise (LCA Ecosystem Restoration Study, glossary).

Ecosystem Restoration- is one of the primary missions of the Corps of Engineers Civil Works Program. The Corps objective in ecosystem restoration planning is to contribute to national ecosystem restoration (NER). For ecosystem restoration projects, a plan that reasonably maximizes ecosystem restoration benefits compared to costs, consistent with the Federal objective, shall be selected (Planning Guidance Notebook, 2-1). Activities that seek to return an organic community of plants and animals and their habitat to a previously existing or improved natural condition or function (LCA Ecosystem Restoration Study, glossary).

Effectiveness- Having an intended or expected effect. One of the USACE four requirements for a project (LCA Ecosystem Restoration Study, glossary).

Efficiency- The quality of exhibiting a high ratio of output to input. One of the USACE four requirements for a project.

Egress- A path or opening for going out; an exit (LCA Ecosystem Restoration Study, glossary).

Electrical Conductivity- The ability of a medium to conduct electricity. Salt water has a higher electrical conductivity that freshwater, and this property allows the measurements of salinity through a simple meter (LCA Ecosystem Restoration Study, glossary).

Embankment- A linear mound of earth or stone existing or built to hold back water or to support a roadway (LCA Ecosystem Restoration Study, glossary).

Encroachment- Entering gradually into an area not previously occupied, such as a plant species distribution changing in response to environmental factors such as salinity (LCA Ecosystem Restoration Study, glossary).

Endangered Species- Animals and plants that are threatened with extinction (LCA Ecosystem Restoration Study, glossary).

Endpoints- see Objectives

Engineering News Record (ENR)- A magazine that provides news needed by anyone in or from the construction industry (LCA Ecosystem Restoration Study, glossary)
Enhance- To augment or increase/heighten the existing state of an area (LCA Ecosystem Restoration Study, glossary).

Entrenchment- Being firmly embedded (LCA Ecosystem Restoration Study, glossary).

Environmental Impact Statement (EIS)- A document that describes the positive and negative environmental effects of a proposed action and the possible alternatives to that action. The EIS is used by the Federal government and addresses social issues as well as environmental ones (LCA Ecosystem Restoration Study, glossary).

Environmental Operating Principles- Describe how the recommendation supports the USACE Environmental Operating Principles, (Planning Guidance Notebook, H-45).

Environmental Sustainability- a synergistic process whereby environmental and economic considerations are effectively balanced through the life cycle of project planning, design, construction, operation and maintenance to improve the quality of life for present and future generations (Planning Guidance Notebook, F6).

Estuary – a semi-enclosed coastal body of water with one or more rivers or streams flow into it and has a free connection open to the sea; often associated with high levels of biological activity. They are often characterized by sedimentation or silt carried in from terrestrial runoff and, frequently, from offshore; contains brackish water; estuaries are marine environments whose pH, salinity, and water levels vary, depending on the river that feeds the estuary and the ocean from which it derives its salinity (oceans and seas have different salinity levels), (Webster Encyclopedia Online).

Estuarine- Related to an estuary (LCA Ecosystem Restoration Study, glossary).

Eustatic sea level rise. Change in global average sea level brought about by an increase in the volume of the world ocean [Intergovernmental Panel of Climate Change (IPCC) 2007b]. See also **relative sea level rise**.

Evaporation- The process by which any substance is converted from a liquid state into, and carried off in, vapor; as, the evaporation of water (LCA Ecosystem Restoration Study, glossary).

Exotic Species- Animal and plant species not native to the area; usually undesirable (hyacinth, nutria, tallow tree, giant salvinia) (LCA Ecosystem Restoration Study, glossary).

F

Faulting- A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are displaced relative to one another and parallel to the plane of fracture (LCA Ecosystem Restoration Study, glossary).

Feasibility Cost Sharing Agreement (FCSA) A type of Project Partnership Agreement (PPA) signed between the Corps of Engineers and non federal sponsor to share the cost of producing a feasibility study.

Feasibility Scoping Meeting (FSM)- The purpose of the FSM is to bring the vertical team, the non-Federal sponsor, and resource agencies together to agree on the problems and solutions to be investigated and the scope of analyses required. An FSM will address the problems, opportunities, and needs; refine study constraints; identify the key alternatives; and further define the scope, depth, and methods of analyses required (Planning Guidance Notebook, H-7).

Feasibility-level Design -a viable document/standard that adheres to the Corps of Engineers requirements; deals with whether a project/aspects of a project is/are capable of being executed. Must be produced for recommended plan; is in accordance with Planning Guidance Notebook ER 1105-2-100 and pertinent ERs, ECs, and EMs (Troy).

Feasibility-level report –a report that meets Corps of Engineers requirements to produce a Chief's report containing a recommendation that can be authorized by Congress (Angie). The objective of feasibility studies is to investigate and recommend solutions to the water resource problems. (50% Federal funded and 50% non-federal funded). These reports document the feasibility study, and provide the basis for a decision on construction authorization of a project. Report includes: EA/EIS to comply with NEPA (Planning Guidance Notebook, G-1). A description of a proposed action, previously outlined in a general fashion in a Reconnaissance Report, that will satisfy the Federal interest and address the problems and needs identified or an area. It must include an assessment of impacts to the environment (either in an Environmental Assessment, or the more robust Environmental Impact Statement), an analysis of alternative methods of completion, and the selection of a Recommended Plan through the use of a cost-effective analysis (LCA Ecosystem Restoration Study, glossary).

Feasibility phase -means the project formulation phase during which all planning activities are performed that are required to demonstrate that Federal participation in a specific project is warranted, culminating in approval of the decision document. All plan formulation must be completed during this phase, including all technical analyses, policy compliance determinations, and Federal and non-Federal environmental and regulatory compliance activities required for approval of the decision document (Planning Guidance Notebook, F-3).

Feature -a structural element that requires construction or assembly on-site, (Planning Guidance Notebook, E-3). (ex rock closure structure at Bayou La Loutre 950ft by 47ft). A constructible increment of an alternative plan (LCA Ecosystem Restoration Study, glossary).

Federal Interest- Define the Federal interest, consistent with Army policies, based on an appraisal of the costs, benefits and environmental impacts of the recommended project alternative (Planning Guidance Notebook, H-44).

Federal Principles Group (FPG)- A collaboration among Federal agencies at the Washington level to facilitate the flow of information, to provide guidance and recommendations to the USACE and LDNR throughout the study process, and to facilitate resolution of any interagency issues that may be identified in the conduct of the study (LCA Ecosystem Restoration Study, glossary).

Final Array- the alternative that best meets the objectives but requires further analysis (Troy). The final grouping of the most effective coast wide plans from which a final recommendation can be made (LCA Ecosystem Restoration Study, glossary).

Final Array of Alternatives- Describe the plans that qualified for the final comparison, including the NED, NER or Combined Plan, and any Locally Preferred Plan. Discuss the rationale for eliminating alternative plans (Planning Guidance Notebook, H-45).

Foreshore Dikes- An embankment of earth and rock built to prevent floods or erosion that is built in the area of a shore that lies between the average high tide mark and the average low tide mark.

Framework Development Team (FDT)- A group of professionals from various Federal and stage agencies, academia and the public formed to provide a forum for individual members to discuss LCA Comprehensive Study activities and technical issues and to provide individual comments to the Senior Management Committee (LCA Ecosystem Restoration Study, glossary).

Fresh Marsh- Intertidal herbaceous plant community typically found in areas of the estuary with salinity ranging from 0-3 ppt (LCA Ecosystem Restoration Study, glossary).

Furbearer- An animal whose skin is covered with fur (mammal), especially fur that is commercially valuable, such as a muskrat, nutria, and mink (LCA Ecosystem Restoration Study, glossary).

G

General navigation features -include dredged material disposal facilities required for construction or operation and maintenance of the other general navigation features. General navigation features of harbor or waterway projects are channels, jetties or breakwaters, locks and dams, basins or water areas for vessel maneuvering, turning, passing, mooring or anchoring incidental to transit of the channels and locks. Also included are dredged material disposal areas (Planning Guidance Notebook, 3-1; F-32).

Geomorphic- Related to geological surface configuration (LCA Ecosystem Restoration Study, glossary).

Geosynclinal Down-warping- The downward bend or subsidence of the earth's crust, which allows of the gradual accumulation of sediment.

Geotropically- Downward growth in response to gravity, as in plant roots (LCA Ecosystem Restoration Study, glossary).

Glycophytes- A plant that cannot live in high salinity environments, most plants (LCA Ecosystem Restoration Study, glossary).

Goals- Statements on what to accomplish and or what is needed to address a problem without specific detail (LCA Ecosystem Restoration Study, glossary).

Gradient- A slope; a series of progressively increasing or decreasing differences in a system or organism (LCA Ecosystem Restoration Study, glossary).

H

Habitat- The place where an organism lives; part of physical environment in which a plant or animal lives (LCA Ecosystem Restoration Study, glossary).

Habitat Evaluation Team. A part of the Project Delivery Team composed of resource agency representatives.

Habitat loss- The disappearance of places where target groups of organisms once lived. In coastal restoration, usually refers to the conservation of marsh or swamp to open water (LCA Ecosystem Restoration Study, glossary).

Habitat Units (HUs)- represent a numerical combination of quality (HIS) and quantity (acres) existing at any given pint in time. The Hus resulting from the future without- and future with-project scenarios are annualized, averaged over the project life, to determine Average Annual Habitat Units (AAHUs). The "benefit" of a project can be quantified by comparing AAHUs between the future without – and the future with-project scenarios. The difference in AAHUs between the two scenarios represents the net benefit attribute to the project in terms of habitat quantity and quality (LCA Ecosystem Restoration Study, glossary).

Hazardous, Toxic, and Radioactive Wastes (HTRW) –Wastes that contain toxic constituents, or that may cause hazardous chemical reactions, including explosive or flammable material, or radioactive wastes, which, improperly managed may present a hazard to human health or the environment (LCA Ecosystem Restoration Study, glossary).

Headland- A point of land projecting into the sea or other expanse of the water, still connected with the mainland (LCA Ecosystem Restoration Study, glossary).

Herbaceous- A plant with no persistent woody stem above ground (LCA Ecosystem Restoration Study, glossary).

Hydrodynamic- The continuous change or movement of water (LCA Ecosystem Restoration Study, glossary).

Hydrology- The pattern of water movement on the earth's surface, in the soil and underlying rocks, and in the atmosphere (LCA Ecosystem Restoration Study, glossary).

Hypoxia- The condition of low dissolved oxygen concentrations (LCA Ecosystem Restoration Study, glossary).

I

Indemnification- Insurance against or compensation for loss of damage (LCA Ecosystem Restoration Study, glossary).

Indirect Impacts- Those effects that are not as a direct result of project construction, but occur as secondary impacts due to changes in the environment brought about by the construction. Constrast with "Direct Impacts" (LCA Ecosystem Restoration Study, glossary).

Infrastructure- The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communication systems, water and power lines, and public institutions including schools, post offices, and prisons (LCA Ecosystem Restoration Study, glossary).

Ingress- An entrance or the act of entering (LCA Ecosystem Restoration Study, glossary).

Initial Array- Every alternative thought of for a project (Troy).

Inorganic- Not derived from living organisms; mineral; matter other than plant or animal (LCA Ecosystem Restoration Study, glossary).

Interdistributary Deposits- Sand and mud deposited between the river channels or between the bayous (LCA Ecosystem Restoration Study, glossary).

Intermediate Marsh (INM)- Intertidal herbaceous plant community typically found in that area of the estuary with salinity ranging from 2-5 ppt (LCA Ecosystem Restoration Study, glossary).

Intertidal- Alternately flooded and exposed by tides (LCA Ecosystem Restoration Study, glossary).

Inundated- to cover or engulf with a flood; deluge (Online Dictionary).

Invertebrates- Animals without backbones, including shrimp, crabs, oysters, and worms (LCA Ecosystem Restoration Study, glossary).

IWR-PLAN. A decision support software program that assists with plan formulation by combining user-defined solutions to planning problems and calculating the effects of each combination, or "plan." The program can assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are best financial investments and displaying the effects of each on a range of decision variables.

L

Land-water Ratio- The relative proportion or wetlands and uplands to water in an area. (LCA Ecosystem Restoration Study, glossary)

Larvae- The stage in some animal's life cycles between egg and adult (mostly in invertebrates) (LCA Ecosystem Restoration Study, glossary)

Leeward- Sheltered from the wind; away from the wind.

Levee- A linear mound of earth or stone built to prevent a river from overflowing; a long, broad, low ridge built by a stream on its flood plain along one or both banks of its channel in time of flood.

Litigation –take legal action.

LCA Plan (Louisiana Coastal Area) -is defined as the one that meets the study objectives, is based upon identification of the most critical natural and human ecological needs, and proposes a program of highly cost effective features to address those needs.

Legal and Policy Constraints- are those defined by law, Corps policy and guidance (LCA Ecosystem Restoration Study, glossary).

Loamy- Soil composed of a mixture of sand, clay, silt, and organic matter (LCA Ecosystem Restoration Study, glossary).

Locally Preferred Plan (LPP) - Alternative plan preferred by local sponsor if other than the Recommended Plan (LCA Ecosystem Restoration Study, glossary).

M

Maintain- To keep in exiting state (LCA Ecosystem Restoration Study, glossary).

Magnetometer surveys- A magnetometer can detect ferrous metal buried tanks, drums, locate graves and archaeological sites containing ferrous metal or produce a magnetic anomaly. Magnetometer surveys are rapid and very accurate (Online Encyclopedia).

Management Measure is a feature (a structural element that requires construction or assembly on-site) or an activity (a nonstructural action) that can be implemented at a specific geographic site that is to address one or more planning objectives. Management measures are the building blocks of alternative plans (Planning Guidance Notebook, 2-4).

Marine Forcing- tidal action or exchange (LCA Ecosystem Restoration Study, glossary).

Measure- a generic type of action that would be taken to address a problem (ex. Shoreline erosion –measure would be breakwaters.

Methodology- A set of practices, procedures, and rules (LCA Ecosystem Restoration Study, glossary).

Mineral Substrate- Soil composed predominately of mineral rather than organic materials; less than 20 percent organic material.

Mitigation- offsetting impacts that have been creating; the creation, restoration, or enhancement of wetlands; required to compensate for authorized activities which will cause unavoidable losses of wetlands (Online Dictionary).

Mudflats- Flat, unvegetated wetlands subject to periodic flooding and minor wave action (LCA Ecosystem Restoration Study, glossary).

Myatt Series- Gray terrance soil, with whitish, pebbly subsoil (LCA Ecosystem Restoration Study, glossary).

Management measures. A feature (a structural element that requires construction or assembly on-site) or an activity (a nonstructural action) that can be combined with other management measures to form alternative plans.

Marsh creation. A type of management measure that creates marsh in open water and nourishes the surrounding existing marsh. Marsh creation will include vegetative plantings. See also marsh nourishment.

Marsh nourishment. A type of management measure that nourishes existing marsh and decreases the depth of nearby open water. See also **marsh creation**.

Model Calibration/Validation. Calibration is an iterative procedure of parameter evaluation and refinement, as a result of comparing simulated and observed values of interest. Model validation is in reality an extension of the calibration process. Its purpose is to assure that the calibrated model properly assesses all the variables and conditions which can affect model results, and demonstrate the ability to predict field observations for periods separate from the calibration effort.

N

National Economic Development (NED) Plan.

National Ecosystem Restoration (NER)- USACE standard for cost-effectiveness based on ecosystem, not economics, benefits (LCA Ecosystem Restoration Study, glossary).

National Ecosystem Restoration (NER) Plan. For ecosystem restoration projects, a plan that reasonably maximizes ecosystem restoration benefits compared to costs, consistent with the Federal objective. The selected plan must be shown to be cost effective and justified to achieve the desired level of output.

Net Gain- The amount of cumulated land gain less and land loss, when gain is greater than loss (LCA Ecosystem Restoration Study, glossary).

Net Loss- The amount of cumulative land gain less land loss, when gain is less than loss.

No Action Alternative- The alternative in the LCA Plan which describes the ecosystem of the coastal area if no restoration efforts/projects were done (LCA Ecosystem Restoration Study, glossary).

Nonstructural measures- reduce flood damages without significantly altering the nature or extent of flooding. Examples are flood proofing, relocation of structures, flood warning and preparedness systems (including associated emergency measures), and regulation of floodplain uses (Planning Guidance Notebook, 3-10).

Nursery- A place for larval or juvenile animals to live, eat, and grow (LCA Ecosystem Restoration Study, glossary)

O

Objectives- More specific statements than "Goals" describing how to achieve the desired targets (LCA Ecosystem Restoration Study, glossary).

Oceanic-dumping- The discharge of wastes or pollutants into offshore waters (LCA Ecosystem Restoration Study, glossary).

Opportunities. Desirable conditions to be achieved.

Organic- Composed of or derived from living things (LCA Ecosystem Restoration Study, glossary).

Oscillations- Fluctuations back and forth, or up and down (LCA Ecosystem Restoration Study, glossary).

Outlet structure- is provided at the downstream end where the system empties into a larger channel (Planning Guidance Notebook, 3-11).

Oxidation of Organic Matter- The decomposition (rotting, breaking down) of plant material through exposure to oxygen (LCA Ecosystem Restoration Study, glossary).

Oxygen-depleted- Situation of low oxygen concentrations where living organisms are stressed (LCA Ecosystem Restoration Study, glossary).

P

Peer Review- Describe how the plan and associated analyses were reviewed for quality, as well as any substantive peer review comments and their resolution (Planning Guidance Notebook, H-45).

Period of analysis. The time horizon for which project benefits, deferred construction costs, and operation, maintenance, repair, rehabilitation, and replacement costs are analyzed. For this study, the period of analysis is from 2025 to 2075.

Petrochemical- Any compound derived from petroleum or natural gas.

Plan- Written account of intended future course of action (scheme) aimed at achieving specific goal(s) or objective(s) within a specific timeframe. It explains in detail what needs to be done, when, how, and by whom, and often includes best case, expected case, and worst case scenarios (Online Business Dictionary).

Planning Objectives- Statement of the intended purposes of the planning process; what alternatives are intended to achieve. Planning Constraints. Restrictions that limit the extent of the planning process (Planning Guidance Notebook, H-44).

Planning Objectives: are statements that describe the desired results of the planning process by solving the problems and taking advantage of the opportunities identified. The planning objectives must be directly related to the problems and opportunities identified for the study and will be used for the formulation and evaluation of plans. Objectives must be clearly defined and provide information on the effect desired (quantified, if possible), the subject of the objective (what will be changed by accomplishing the objective), the location where the expected result will occur, the timing of the effect (when would the effect occur) and the duration of the effect (Planning Guidance Notebook, 2-3).

Plan formulation is the process of developing management measures and plans that meet planning objectives and avoid planning constraints (Planning Guidance Notebook, E-3).

Plan Formulation Rationale- Strategies and approaches used to develop alternative plans, (Planning Guidance Notebook, H-45).

Planning Scale- Planning term that reflects the degree to which environmental processes would be restored or reestablished and the resulting ecosystem and landscape changes that would be expected over the next 50 years. The uppermost scale is referred to as "Increase." No net loss of ecosystem function is "Maintain" Reducing the projected rate of loss of function is "Reduce." The lowest possible scale was no futher action above and beyond existing projects and programs (LCA Ecosystem Restoration Study, glossary).

Point-Bar Deposit- The shallow depositional area on the inside of a river bank (LCA Ecosystem Restoration Study, glossary).

Post-larval- Stage in an animal's lifecycle after metamorphosis from the larval stage, but not yet full grown (LCA Ecosystem Restoration Study, glossary).

Potable Water- Water that is fit to drink. (LCA Ecosystem Restoration Study, glossary).

ppt- parts per thousand. The salinity of ocean water is approximately 35ppt (LCA Ecosystem Restoration Study, glossary).

Primary Consolidation/ Secondary Compression- Two processes acting on a substrate that had a load applied to it to cause the sediment to increase in density, and to decrease in volume.

Prime Farmland- Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. One of the categories of concern in the EIS (LCA Ecosystem Restoration Study, glossary).

Principles- Framing statements that can be used to evaluate alternatives while considering issues that affect them. Used along with targets and assessments of ecosystem needs to provide guidance in formulation of alternative plans (LCA Ecosystem Restoration Study, glossary).

Prior Reports and Existing Water Projects -Include a concise discussion of relevant prior studies, reports, NEPA documents and Endangered Species Surveys, existing water projects, and other key related activities.

Also include relevant documents and projects undertaken by entities other than the Corps (Planning Guidance Notebook, H-44).

Problems. Undesirable conditions to be solved.

Problems and Opportunities- Specify the key problems being addressed and the opportunities for alleviating them (Planning Guidance Notebook, H-44).

Produced water.

Productivity- Growth of plants and animals (LCA Ecosystem Restoration Study, glossary).

Programmatic Environmental Impact Statement (PEIS) –an Environmental Impact Statement that supports a broad authorization for action, contingent on more specific detailing of impacts from specific measures (LCA Ecosystem Restoration Study, glossary) .

Project Delivery Team. A multi-disciplinary, multi-agency team responsible for the successful development and execution of all aspects of the study.

Project Location/Congressional District- Include a concise description of the study area and project location (including clear maps with all key features identified) and identify the Congressional District(s), (Planning Guidance Notebook, H-44).

Project Partnership Agreement (PPA)-A legal contract between the Corps and a sponsor; lays out scope of work, purpose of effort, roles, responsibility, cost, and schedule (Troy).

Province- A major diversion of the coastal area of Louisiana (ex. Deltaic Plain and Chenier Plain) (LCA Ecosystem Restoration Study, glossary).

Pulsing- Letting a diversion flow periodically at a high rate for a short time, rather than continuously (LCA Ecosystem Restoration Study, glossary).

Q

Quantitative- Able to assign a specific number; susceptible to measurement. (LCA Ecosystem Restoration Study, glossary).

R

Radiocarbon Age Determination- The use of ratio of carbon isotopes to determine age (LCA Ecosystem Restoration Study, glossary).

Rebuild- To some extent build back a structure/landform that has once existed (LCA Ecosystem Restoration Study, glossary).

Recommended plan- The alternative course of action proposed for implementation. (Caroline) Is the result of all of the scoping analysis refinement and decision making that determines the most acceptable course of action (Andy). **-**Identify the selected plan, and describe the rationale supporting the selection. List the significant features with one or two measures of scale for each one (Planning Guidance Notebook, H-45).

Reconnaissance Report- A document prepared as part of major authorization that examines a problem or need and determines if sufficient methods and Federal interest exists to address the problem/need. If so, then a “Feasibility Report” is prepared, which details the solution and its impacts further (LCA Ecosystem Restoration Study, glossary).

Reduce- To diminish the rate or speed of process (LCA Ecosystem Restoration Study, glossary).

Regional Working Group (RWG)- An inter-agency team formed to support the Washington-level change; the change in average water level with respect to the surface (LCA Ecosystem Restoration Study, glossary).

Rehabilitate- To focus on historical or pre-existing ecosystems as models or references while emphasizing the reparation of ecosystem processes, productivity and service (LCA Ecosystem Restoration Study, glossary).

Relative Sea Level Exchange- The sum of the sinking of the land (subsidence) and eustatic sea level change; the change in average water level with respect to the surface (LCA Ecosystem Restoration Study, glossary).

Relative sea level rise. Sea level rise measured by a tide gauge with respect to the land upon which it is situated. Relative sea level rise occurs where there is a local change in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence. See also **eustatic sea level rise**.

Resource Constraints -are those associated with limits on knowledge, expertise, experience, ability, data, information, money, and time (Planning Guidance Notebook, 2-3).

Restore- Return a wetland to an approximation of its condition or function prior to disturbance by modifying conditions responsible for the loss or change; re-establish the function and structure of that ecosystem (LCA Ecosystem Restoration Study, glossary).

Risk. A measure of the probability and severity of undesirable consequences (including, but not limited to, loss of life, threat to public safety, environmental and economic damages).

S

Sangamonian Interglacial Period- the last interglacial period before the Holocene period (the current geological period) (LCA Ecosystem Restoration Study, glossary).

Saline Marsh (SAM)- Intertidal herbaceous plant community typically found in that area of the estuary with salinity ranging from 12-32 ppt (LCA Ecosystem Restoration Study, glossary).

Salinity- The concentration of dissolved salts in a body of water, commonly expressed as parts per thousand (LCA Ecosystem Restoration Study, glossary).

Salt Marshes- See “Saline Marsh”

Scoping- required by NEPA (involved with water resource planning); a process that determines the scope of issues to be addressed and identifies the significant issues related to a proposed action (Planning Guidance Notebook, 2-2 and 2-3). Soliciting and receiving public input to determine issues, resources, impacts, and alternatives to be addressed in the draft EIS (LCA Ecosystem Restoration Study, glossary).

Scouring- the erosion and excavation of soil caused by river current (Online Dictionary)

Sea Level- Long-term average position of the sea surface (LCA Ecosystem Restoration Study, glossary)

Sediment Plume- Caused by sediment rich rainwater runoff entering the ocean. The runoff creates a visible pattern of brown water that is rich in nutrients and suspended sediments that forms a kind of cloud in the water spreading out from the coastline. Commonly forms at river and stream mouths, near sloughs, and along coasts where a large amount of rain runoff flows directly into the ocean (LCA Ecosystem Restoration Study, glossary).

Sheet Flow- Flow of water, sediment, and nutrients across a flooded wetland surface, as opposed to through channels (LCA Ecosystem Restoration Study, glossary).

Shoaling- The shallowing of an open-water area through deposition of sediments (LCA Ecosystem Restoration Study, glossary).

Slikensides- The smooth or partially polished surface of rock caused by one rock mass sliding over another in a fault plane (LCA Ecosystem Restoration Study, glossary).

Social- Relating to human society and its modes of organization (LCA Ecosystem Restoration Study, glossary).

Socioeconomic- Involving both social and economic factors (LCA Ecosystem Restoration Study, glossary).

Stabilize- To fix the level or fluctuation of; to make stable (LCA Ecosystem Restoration Study, glossary).

State Historic Preservation Office (SHPO)- The part of the Louisiana Department of Culture, Recreation, and Tourism that deals with Native American sites and other archaeological/historic sites (LCA Ecosystem Restoration Study, glossary).

Stillstand- A period of time when sea level did not change (LCA Ecosystem Restoration Study, glossary).

Storm Overwash- The process by which sand is transposed landward over the dunes during a storm even by waves (LCA Ecosystem Restoration Study, glossary).

Storm Surge- An abnormal and sudden rise of the sea along a shore as a result of the winds of a storm (LCA Ecosystem Restoration Study, glossary).

Stough soils- Yellowish brown coarse-loamy soil (LCA Ecosystem Restoration Study, glossary).

Strategy- Ecosystem restoration concept from the Coast 2050 Plan (LCA Ecosystem Restoration Study, glossary).

Stream Gaging Data- Records of water levels in streams and rivers (LCA Ecosystem Restoration Study, glossary).

Study Authority- Include the full text of principal resolutions(s) or other authority (Planning Guidance Notebook, H-44).

Study planning objectives: which are more specific in terms of expected or desired outputs (Planning Guidance Notebook, 2-1).

Study Purpose and Scope- State whether the report is an interim or final response to the study authority. Succinctly identify the study purpose and scope, (Planning Guidance Notebook, H-44).

Study Sponsor- Include the name(s) of the study sponsor(s), (Planning Guidance Notebook, H-44).

Structural Measures- Structural measures are physical modifications designed to reduce the frequency of damaging levels of flood inundation. Structural measures include: dams with reservoirs, dry dams, channelization measures, levees, walls, diversion channels, pumps, ice-control structures, and bridge modifications (Planning Guidance Notebook, 3-10).

Submergence- Going under water (LCA Ecosystem Restoration Study, glossary).

Subprovince- The divisions of the two Provinces (see "Province") into smaller groupings: 1) East of the Mississippi River; 2) West of the Mississippi River to Bayou Lafourche; 3) Bayou Lafourche to Freshwater Bayou; 4) Freshwater Bayou to Sabine River (LCA Ecosystem Restoration Study, glossary).

Subsidence- The gradual downward settling or sinking of the Earth's surface with little or no horizontal motion (LCA Ecosystem Restoration Study, glossary).

Sustain- To support and provide with nourishment to keep in existence; maintain (LCA Ecosystem Restoration Study, glossary).

Systems / Watershed Context- Describe how the Recommended Plan is integrated with other watershed purposes. Discuss agency partnerships and cooperation. Include which other agencies were invited to be formal Cooperating Agencies and those which accepted, and identify the responsible lead agency (Planning Guidance Notebook, H-45).

T

Tarbert Flow- Stream gage date recorded Tarbert's Landing on the Mississippi River (LCA Ecosystem Restoration Study, glossary).

Target- A desired ecosystem state that meets an objective or set of objectives (LCA Ecosystem Restoration Study, glossary).

Tentatively Selected Plan- a plan that teams select, which is the recommended plan but remains tentative until approved by the chief of Engineers (Troy).

Terrestrial Habitat- The land area or environment where an organism lives; as distinct from water or air habitats (LCA Ecosystem Restoration Study, glossary).

Third Delta- A proposed project that would divert up to 120,000 cubic feet of water per second from the Mississippi River near Donaldsonville, Louisiana down a conveyance channel to the marshes in southern Barataria and Terrebonne Basins. (LCA Ecosystem Restoration Study, glossary).

Toxicity- The measure of how poisonous something is (LCA Ecosystem Restoration Study, glossary).

Transpiration- The process by which water passes through living plants into the atmosphere (LCA Ecosystem Restoration Study, glossary).

Trenasse- A small manmade trench through a swamp or marsh allowing travel by small boats (LCA Ecosystem Restoration Study, glossary).

Turbidity- The level of suspended sediments in water; opposite of clarity or clearness (LCA Ecosystem Restoration Study, glossary).

U

Uncertainty. Uncertainty is the result of imperfect knowledge concerning the present or future state of a system, event, situation, or (sub) population under consideration. There are two types of uncertainty: aleatory and epistemic. Aleatory uncertainty is the uncertainty attributed to inherent variation which is understood as variability over time and/or space. Epistemic uncertainty is the uncertainty attributed to our lack of knowledge about the system (e.g., what value to use for an input to a model or what model to use). Uncertainty can lead to lack of confidence in predictions, inferences, or conclusions.

Unique Farmland- Land other than Prime Farmland (see "Prime Farmland") that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits, and vegetables (LCA Ecosystem Restoration Study, glossary).

Upconing- The tendency of underground salt water to move closer to the surface in the vicinity of a well as it fills the areas where the freshwater is drawn out (LCA Ecosystem Restoration Study, glossary).

Upland (UPL)- A general term for non-wetland elevated land above low areas along streams or between hills (LCA Ecosystem Restoration Study, glossary).

W

Water Resource Units (WRU)- Stage-damage data developed as part of the Flood Damage Estimation System (FDES) in 1980 for the Mississippi River and Tributaries (MR&T) project were used to estimate the flood damages that are expected to occur in Subprovinces 1, 2, and 3. The date collected for the FDES were delineated into geographic areas with homogenous physical and hydraulic characteristics. These geographic areas were numerically coded and designated as Water Resource Units (WRUs). Within each WRU, land-use elements (structures, cropland, roads, bridges, railroads, ect) were categorized by location, value, and corresponding depth-damage relationship. The structural damage categories included: residential, commercial, industrial, public, and farm building (LCA Ecosystem Restoration Study, glossary).

Water Resources Development Act (WRDA) – A bill passed by Congress that provides authorization and/or appropriation for projects related to the conservation and development of water and related resources (LCA Ecosystem Restoration Study, glossary).

Weir- A dam placed across a canal or river to raise, divert, regulate or measure the flow of water (LCA Ecosystem Restoration Study, glossary).

Wetland Value Assessment (WVA). A quantitative habitat-based assessment methodology used to determine wetland benefits of restoration measures. The WVA quantifies changes in fish and wildlife habitat quality and quantity that are expected to result from a proposed wetland restoration project. The results of the WVA, measured in Average Annual Habitat Units (AAHUs), can be combined with cost data to provide a measure of the effectiveness of a proposed project in terms of annualized cost per AAHU gained. In addition, the WVA methodology provides an estimate of the number of acres benefited or enhanced by the project and the net acres of habitat protected/restored.

SOUTHWEST COASTAL LOUISIANA
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AND
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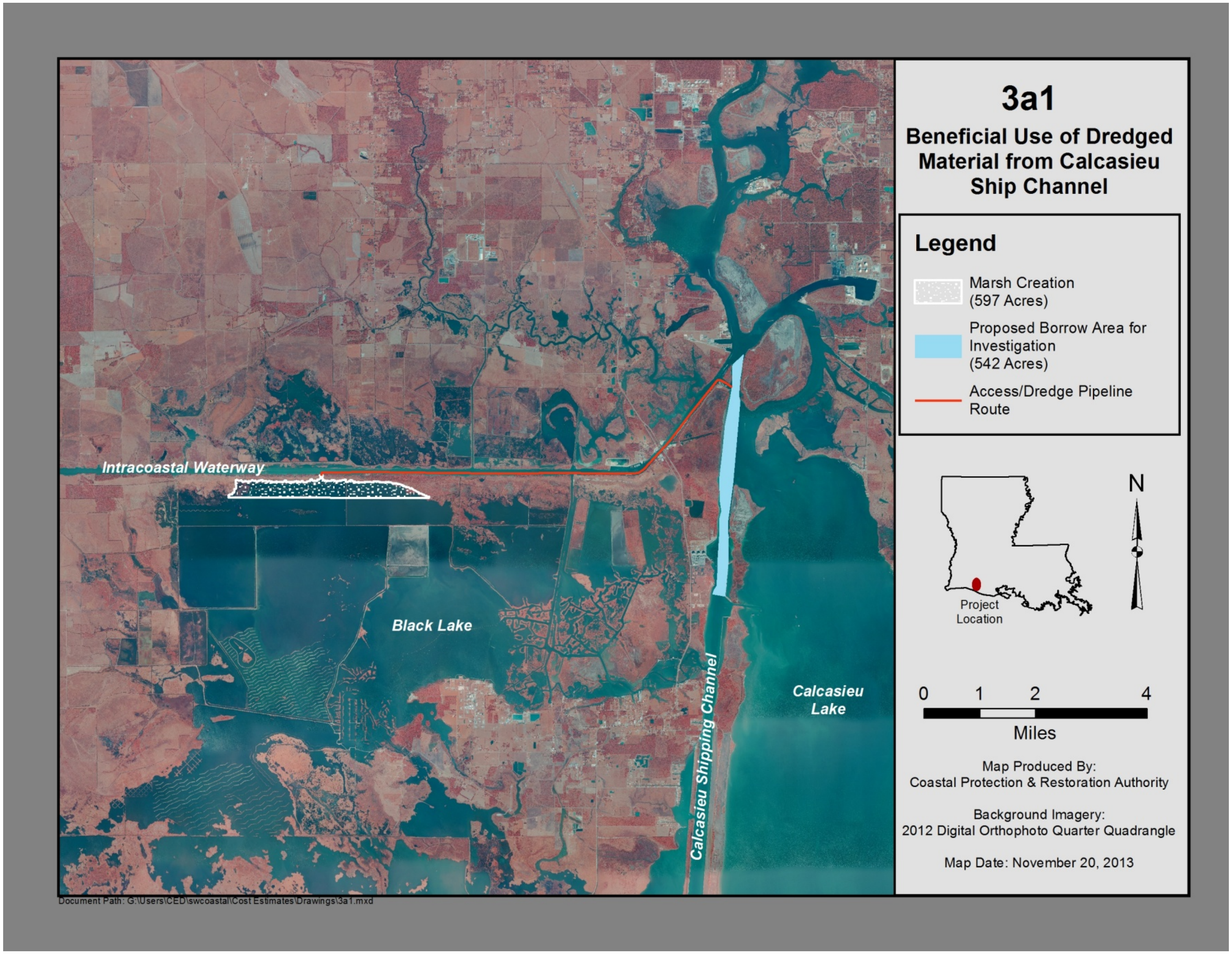
ANNEX V

Borrow Maps



3a1
Beneficial Use of Dredged Material from Calcasieu Ship Channel
Legend
Marsh Creation (597 Acres)
Proposed Borrow Area for Investigation (542 Acres)
Access/Dredge Pipeline Route
Intracoastal Waterway
Black Lake
Calcasieu Shipping Channel
Calcasieu Lake
Project Location
N
0 1 2 4
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 20, 2013
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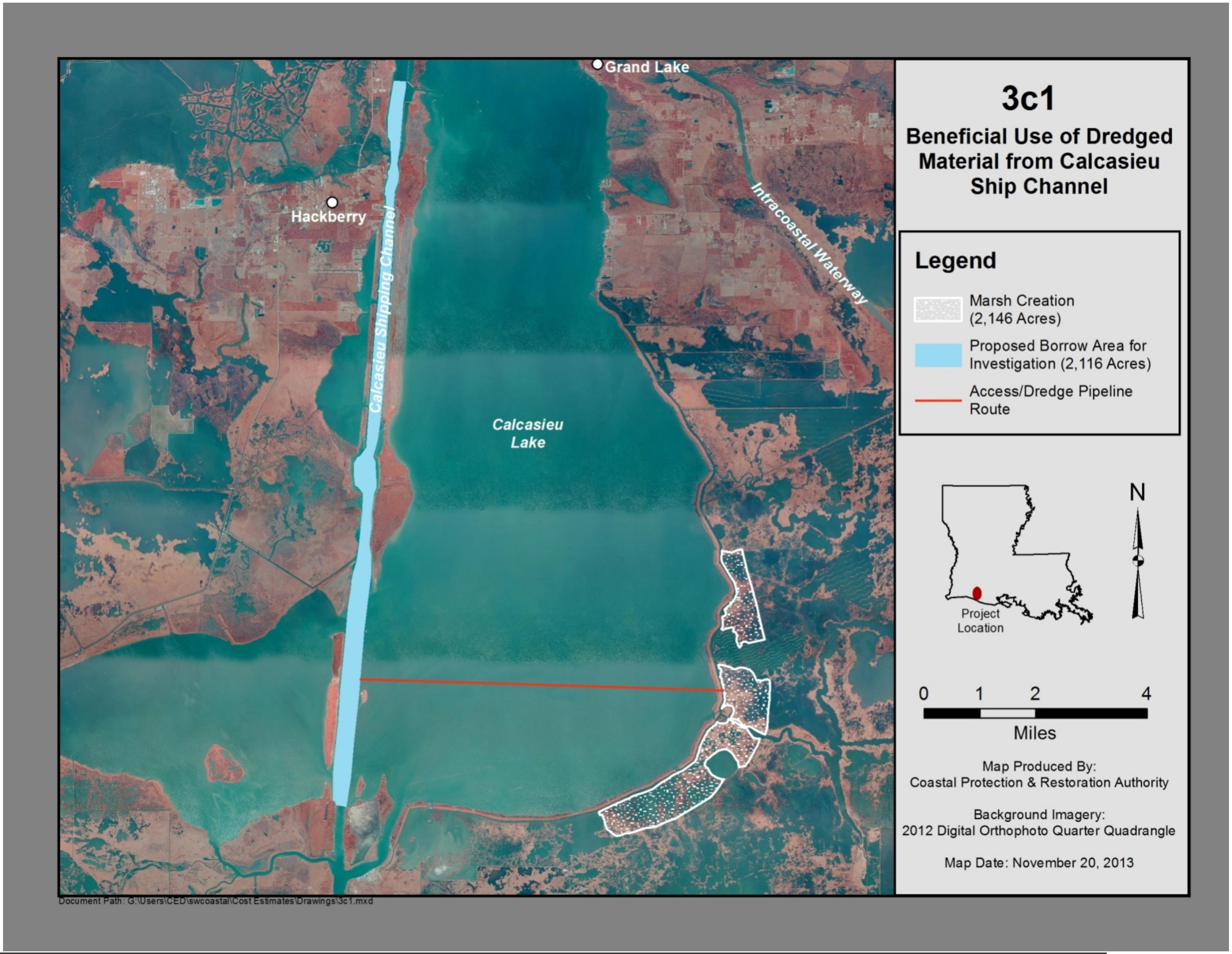
Grand Lake
Hackberry
Calcasieu Shipping Channel
Intracoastal Waterway
Calcasieu
Lake
3c1
Beneficial Use of Dredged
Material from Calcasieu
Ship Channel
Legend
Marsh Creation
(2,146 Acres)
Proposed Borrow Area for
Investigation (2,116 Acres)
Access/Dredge Pipeline
Route
N
Project
Location
0 1 2 4
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
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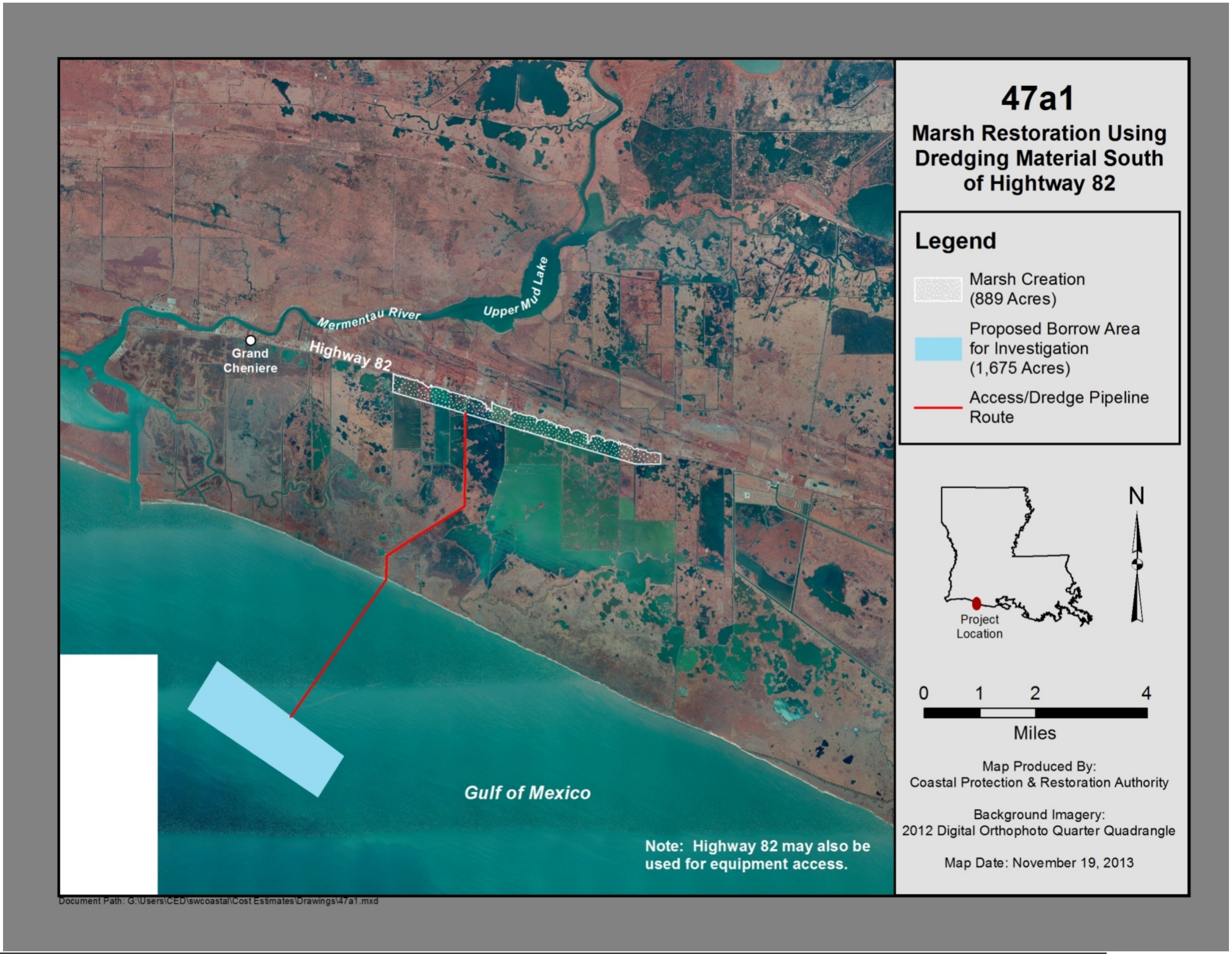
47a1
Marsh Restoration Using Dredging Material South of Hightway 82
Legend
Marsh Creation (889 Acres)
Proposed Borrow Area for Investigation (1,675 Acres)
Access/Dredge Pipeline Route
Project Location
N
0
1
2
4
Miles
Map Produced By: Coastal Protection & Restoration Authority
Background Imagery: 2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 19, 2013
Mermentau River
Upper Mud Lake
Grand Cheniere
Highway 82
Gulf of Mexico
Note: Highway 82 may also be used for equipment access.
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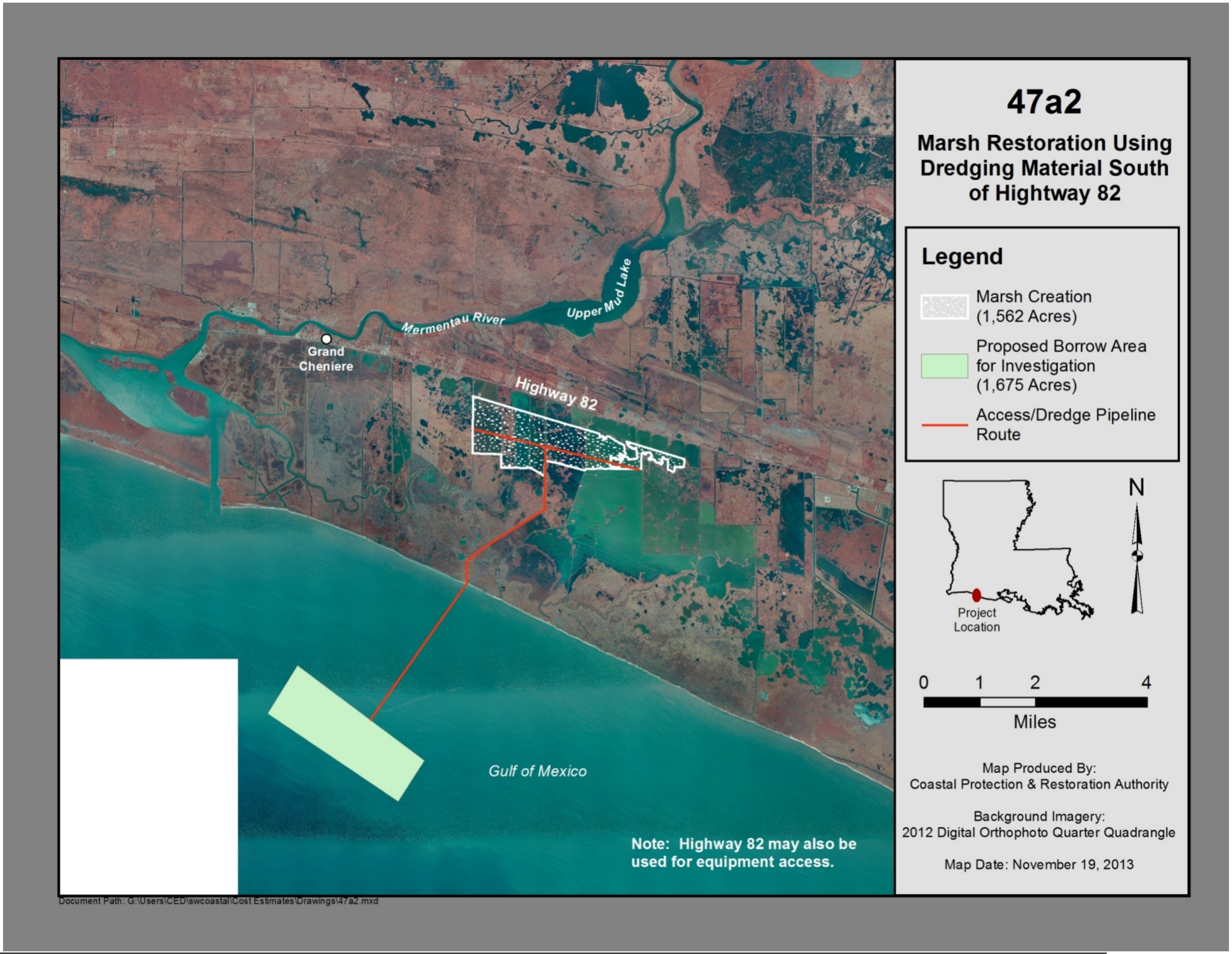
47a2
Marsh Restoration Using Dredging Material South of Hightway 82
Legend
Marsh Creation (1,562 Acres)
Proposed Borrow Area for Investigation (1,675 Acres)
Access/Dredge Pipeline Route
N
Project Location
0 1 2 4
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 19, 2013
Upper Mud Lake
Mermentau River
Grand Cheniere
Highway 82
Gulf of Mexico
Note: Highway 82 may also be used for equipment access.
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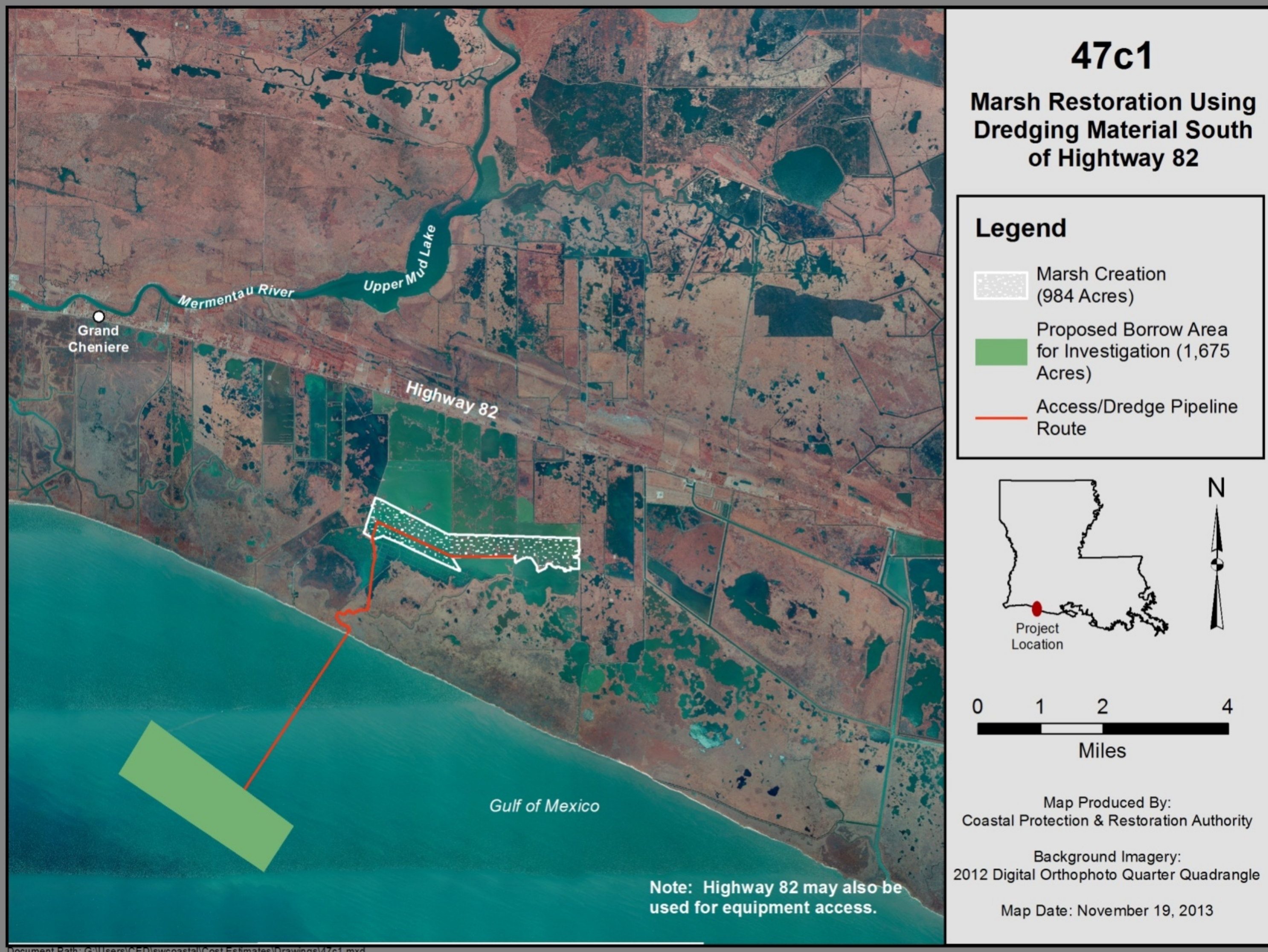
47c1
Marsh Restoration Using Dredging Material South of Hightway 82
Legend
Marsh Creation (984 Acres)
Proposed Borrow Area for Investigation (1,675 Acres)
Access/Dredge Pipeline Route
N
Project Location
0 1 2 4
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 19, 2013
Upper Mud Lake
Mermentau River
Grand Cheniere
Highway 82
Gulf of Mexico
Note: Highway 82 may also be used for equipment access.
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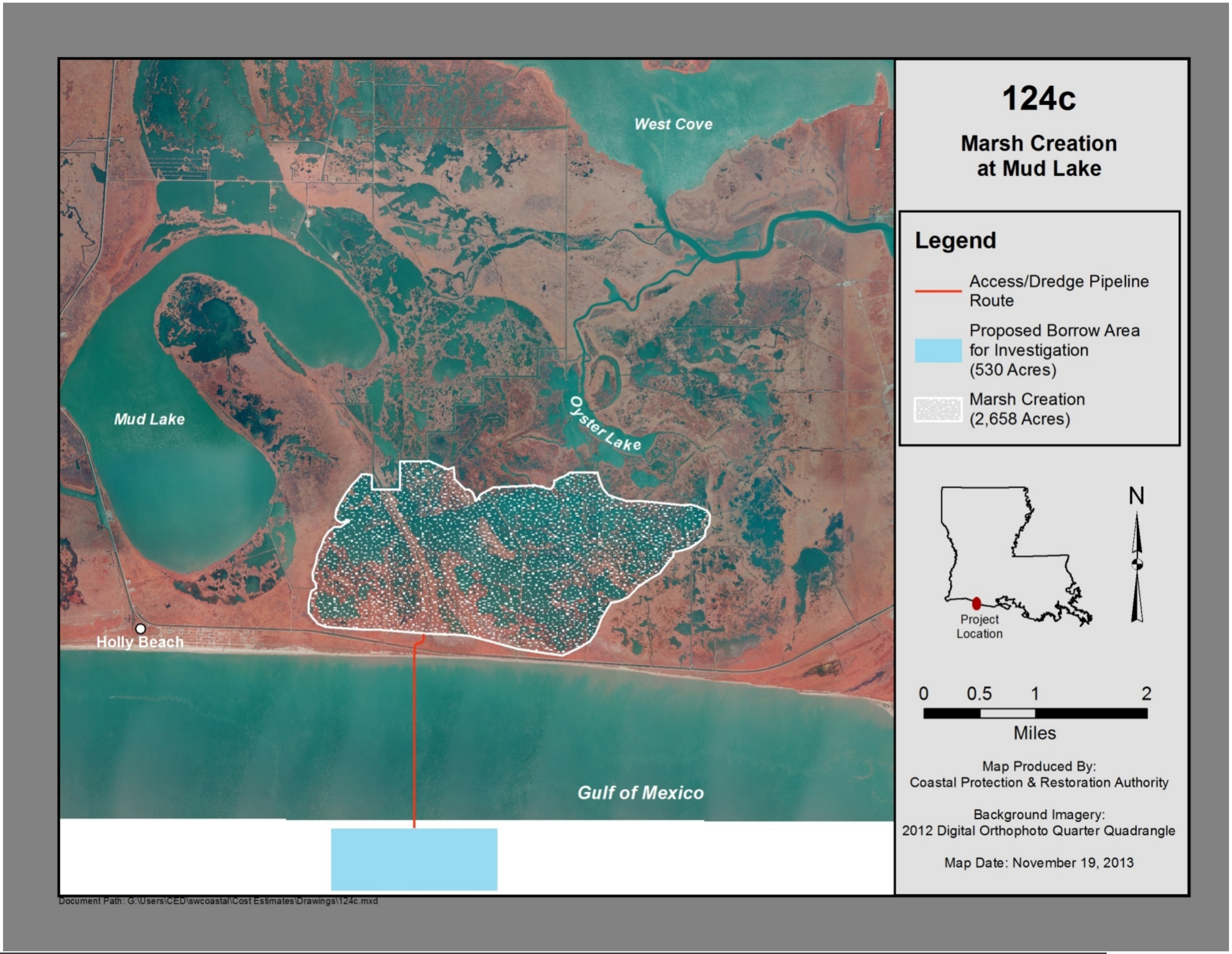
124c
Marsh Creation at Mud Lake
Legend
Access/Dredge Pipeline Route
Proposed Borrow Area for Investigation (530 Acres)
Marsh Creation (2,658 Acres)
West Cove
Mud Lake
Oyster Lake
Holly Beach
Gulf of Mexico
Project Location
N
0 0.5 1 2
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 19, 2013
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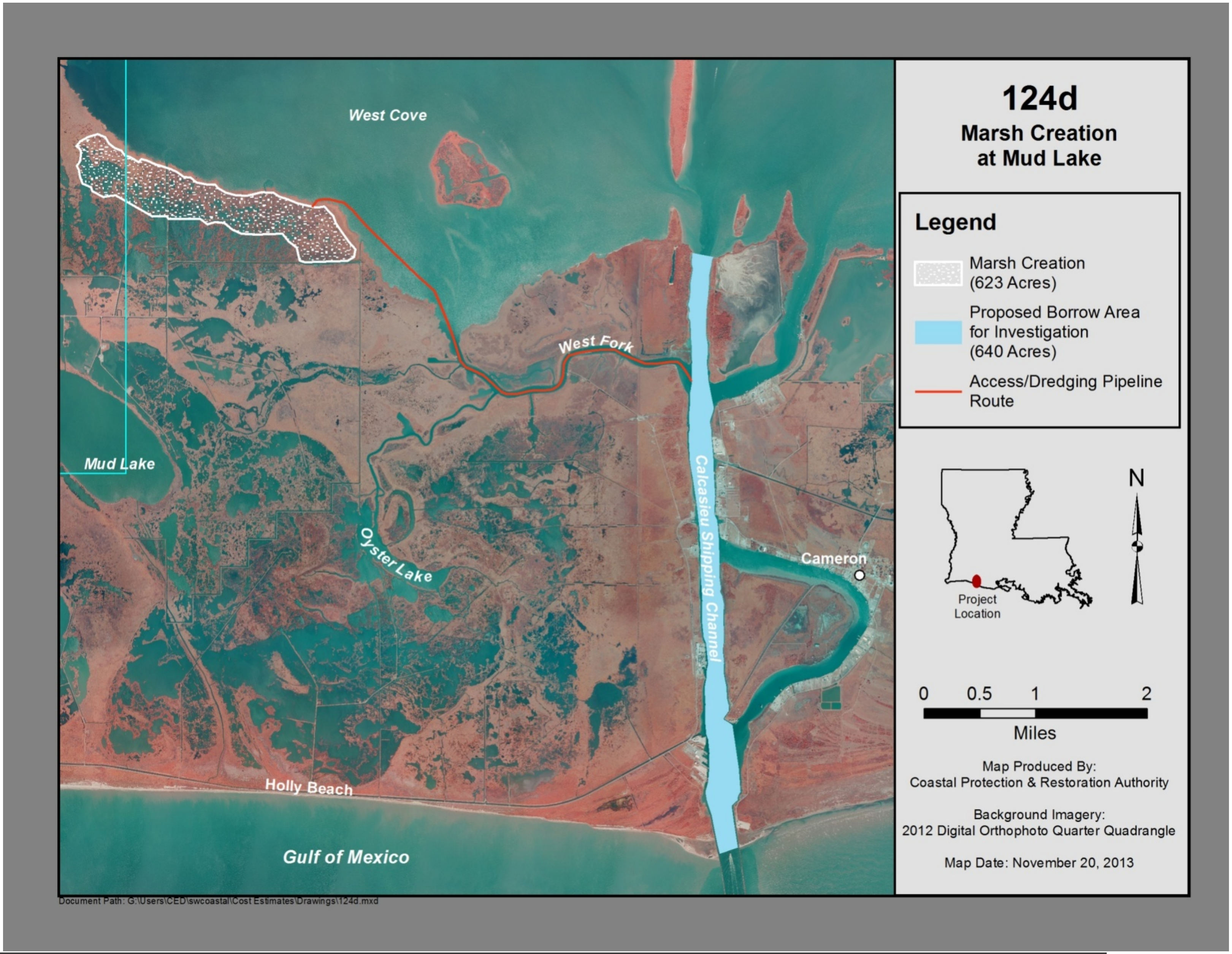
124d
Marsh Creation
at Mud Lake
Legend
Marsh Creation
(623 Acres)
Proposed Borrow Area
for Investigation
(640 Acres)
Access/Dredging Pipeline
Route
N
Project
Location
0
0.5
1
2
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 20, 2013
West Cove
West Fork
Mud Lake
Oyster Lake
Calcasieu Shipping Channel
Cameron
Holly Beach
Gulf of Mexico
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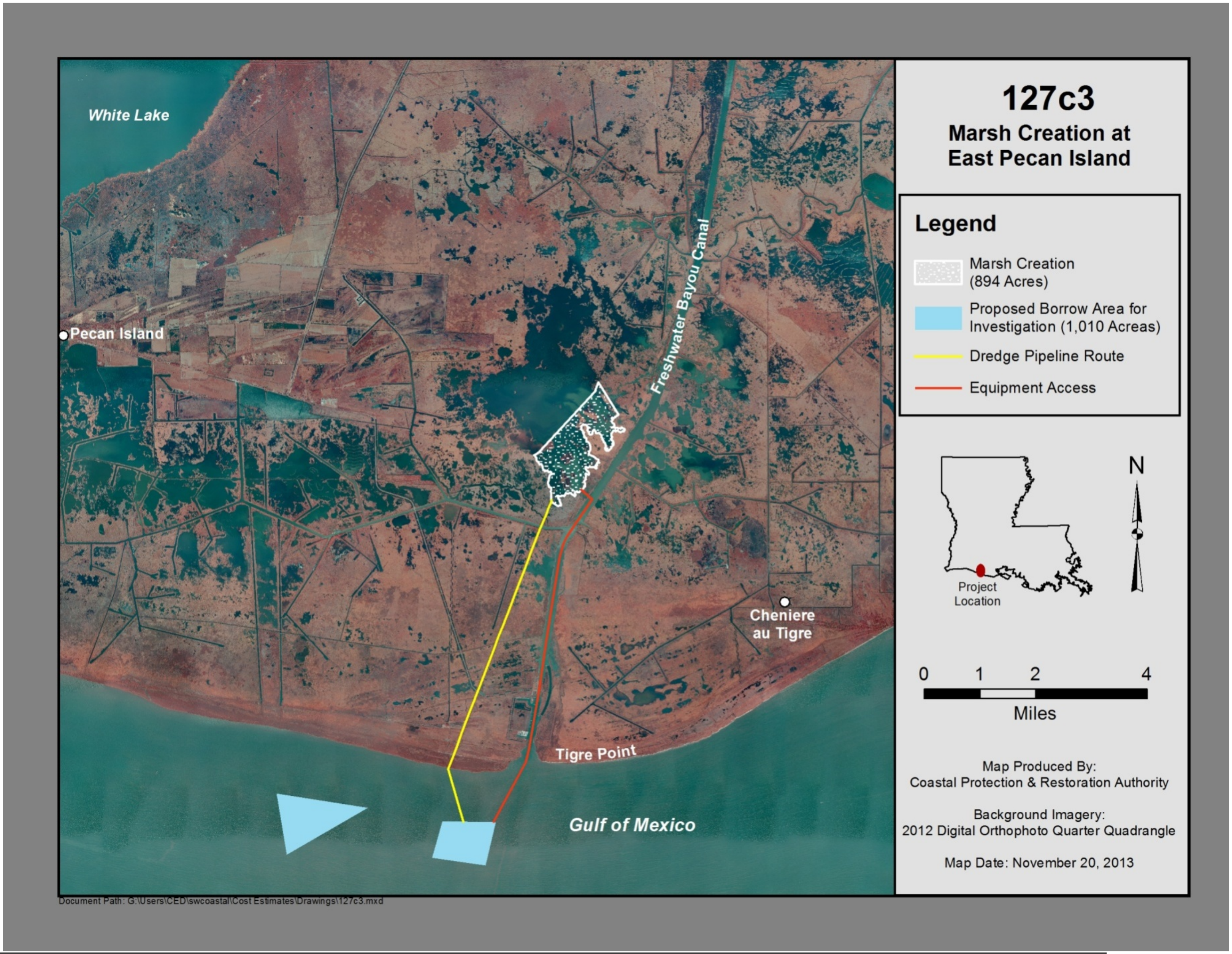
127c3
Marsh Creation at
East Pecan Island
Legend
Marsh Creation
(894 Acres)
Proposed Borrow Area for
Investigation (1,010 Acreas)
Dredge Pipeline Route
Equipment Access
N
Project
Location
0 1 2 4
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 20, 2013
White Lake
Pecan Island
Freshwater Bayou Canal
Cheniere
au Tigre
Tigre Point
Gulf of Mexico
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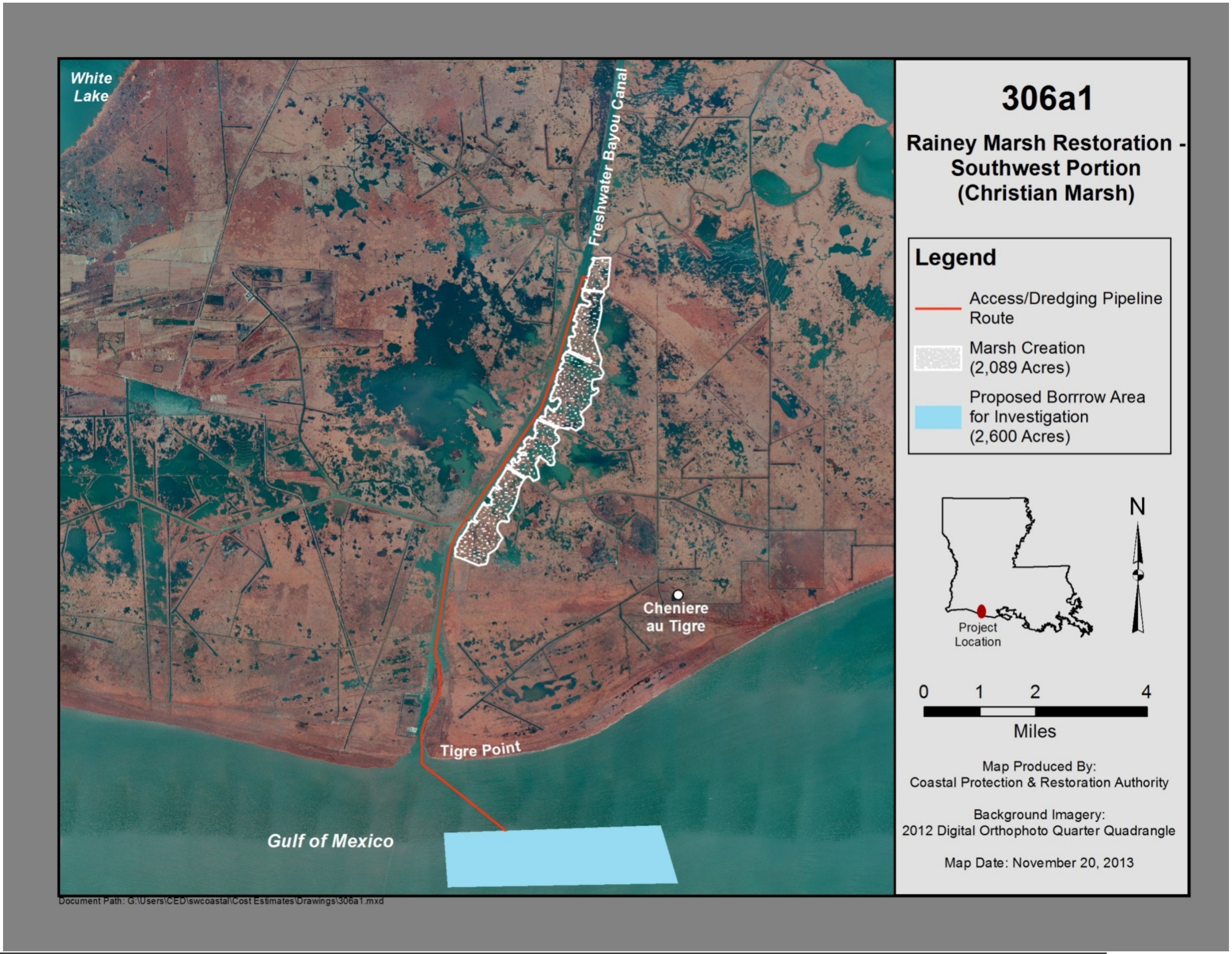
White Lake
Freshwater Bayou Canal
306a1
Rainey Marsh Restoration - Southwest Portion (Christian Marsh)
Legend
Access/Dredging Pipeline Route
Marsh Creation (2,089 Acres)
Proposed Borrrow Area for Investigation (2,600 Acres)
N
Project Location
0 1 2 4
Miles
Map Produced By:
Coastal Protection & Restoration Authority
Background Imagery:
2012 Digital Orthophoto Quarter Quadrangle
Map Date: November 20, 2013
Cheniere au Tigre
Tigre Point
Gulf of Mexico
Document Path: G:\Users\CED\swcoastal\Cost Estimates\Drawings\306a1.mxd

SOUTHWEST COASTAL LOUISIANA
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ANNEX W

Hypertemporal Subunit Change Rate and Map

Gaining Subunits

(001) Black Bayou: 1984 to 2010 change rate = +35.1 ac/yr or +0.165%/yr

(003) Brown's Lake: 1984 to 2010 change rate = +6.12 ac/yr or +0.083%/yr

(005) Calcasieu Ship Channel North: 1984 to 2010 change rate = +6.78 ac/yr or +0.032%/yr
This gain rate is likely due to the disposal of dredge material. Assume that this practice continues but no new land is built due to the lack of room for expansion.

(006) Calcasieu Ship Channel South: 1984 to 2010 change rate = +2.79 ac/yr or +0.056%/yr

(009) Cameron Creole Front Ridge: 1984 to 2010 change rate = +2.41 ac/yr or +0.024%/yr
This unit is mostly upland.

(011) Deer-Rabbit Islands: 1984 to 2010 change rate = +11.1 ac/yr or +0.242%/yr

(012) E. Black Lake: 1984 to 2010 change rate = +6.39 ac/yr or +0.038%/yr

(015) E. Second Bayou: 1984 to 2010 change rate = +17.6 ac/yr or +0.172%/yr

(018) Grand Lake Ridge: 1984 to 2010 change rate = +3.0 ac/yr or +0.044%/yr
This unit is mostly upland.

(019) Gray Canal: 1984 to 2010 change rate = +44.4 ac/yr or +0.255%/yr

(022) Jimmy Savoie Rd: 1984 to 2010 change rate = +2.24 ac/yr or +0.062%/yr
This unit is mostly upland.

(026) Martin Beach Ship Canal Shore: 1984 to 2010 change rate = +22.4 ac/yr or +0.15%/yr

(029) N. Browns Lake: 1984 to 2010 change rate = +88.6 ac/yr or +0.376%/yr

(031) Northern Prairie Terraces: 1984 to 2010 change rate = +2.43 ac/yr or +0.055%/yr
This unit is mostly upland.

(032) Phoenix Lake: 1984 to 2010 change rate = +45.0 ac/yr or +0.476%/yr

(033) S. Black Bayou Oilfield: 1984 to 2010 change rate = +1.24 ac/yr or +0.019%/yr

(039) Sabine River North: 1984 to 2010 change rate = +0.85 ac/yr or +0.012%/yr

(042) Southern Prairie Terraces: 1985 to 2009 change rate = +1.80 ac/yr or +0.092%/yr
This unit is mostly upland.

(044) Starks Bayou: 1984 to 2010 change rate = +3.65 ac/yr or +0.082%/yr

(045) Sweet Lake Canals: 1984 to 2010 change rate = +5.15 ac/yr or +0.021%/yr

(049) W. Johnson's Bayou: 1984 to 2010 change rate = +0.34 ac/yr or +0.007%/yr

(050) W. Second Bayou: 1984 to 2010 change rate = +33.0 ac/yr or +0.373%/yr

(051) West Cove Canal: 1984 to 2010 change rate = +51.1 ac/yr or +0.844%/yr

(054) Chenier Perdue Ridge: 1984 to 2010 change rate = +18.5 ac/yr or +0.151%/yr
This subunit includes some upland.

(063) Grand/White Lake Landbridge: 1984 to 2010 change rate = +26.4 ac/yr or +0.116%/yr

(067) Lake Benoit: 1984 to 2010 change rate = +16.8 ac/yr or +0.032%/yr

(075) Pumpkin Ridge: 1984 to 2010 change rate = +2.58 ac/yr or +0.012%/yr

(079) S. Lake Misere/Lacassine 1984 to 2010 change rate = +10.9 ac/yr or +0.034%/yr

(080) S. Pecan Island Shoreline: 1984 to 2010 change rate = +33.4 ac/yr or +0.434%/yr

(083) W. Big Burn: 1984 to 2010 change rate = +89.7 ac/yr or +0.52%/yr

(090) E. Cote Blanche Wetlands: 1984 to 2010 change rate = +13.5 ac/yr or +0.024%/yr

(095) Rainey Marsh: 1984 to 2010 change rate = +3.06 ac/yr or +0.010%/yr

(102) W. Cote Blanche Wetlands: 1984 to 2010 change rate = +8.90 ac/yr or +0.033%/yr

Subunits that may be managed and/or impounded? - hold 2004 acreages constant ala Barras et al LCA Study?

(034) S. Browns Lake: 1984 to 2010 change rate = +58.9 ac/yr or +0.841%/yr
Sabine Refuge's Unit 1A/1B.

(037) Sabine Pool #3: 1984 to 2010 change rate = +48.1 ac/yr or +0.183%/yr

(056) Cut Around Bayou: 1984 to 2010 change rate = -83.9 ac/yr or -0.402%/yr

(057) E. Lacassine NWR: 1984 to 2010 change rate = -11.3 ac/yr or -0.067%/yr

(060) Eastern White Lake Wetlands: 1984 to 2010 change rate = -153 ac/yr or -0.497%/yr
White Lake Conservation Area.

(072) NE White Lake: 1984 to 2010 change rate = -92.0 ac/yr or -0.850%/yr

(073) Northwestern White Lake Wetlands: 1984 to 2010 change rate = +24.3 ac/yr or +0.139%/yr

(076) Rockefeller: 1984 to 2010 change rate = -43.4 ac/yr or -0.056%/yr

(081) S. White Lake: 1984 to 2010 change rate = -148 ac/yr or -0.67%/yr

(082) Southwestern White Lake Wetlands: 1984 to 2010 change rate = +31.8 ac/yr or +0.61%/yr

(085) W. Lacassine NWR: 1984 to 2010 change rate = -89.3 ac/yr or -0.531%/yr

(096) S. Marsh Island: 1984 to 2010 change rate = +4.86 ac/yr or +0.064%/yr

Losing Subunits

(002) Boudreaux Lake: 1984 to 2010 change rate = -10.9 ac/yr or -0.060%/yr

(004) Calcasieu Lake – West Cove: 1984 to 2010 change rate = -3.75 ac/yr or -0.041%/yr

(008) Cameron Creole Back Ridge: 1984 to 2010 change rate = -22.5 ac/yr or -0.24%/yr
This unit includes upland, but there are enough wetland acres in this unit to lose over study period.

(010) Clear Marais: 1984 to 2010 change rate = -12.1 ac/yr or -0.125%/yr

(014) E. Johnson's Bayou: 1984 to 2010 change rate = -25.0 ac/yr or -0.217%/yr

(016) East Pass: 1984 to 2010 change rate = -2.21 ac/yr or -0.031%/yr

(017) Ellis Moss Rd: 1984 to 2010 change rate = -0.30 ac/yr or -0.04%/yr

(020) Gum Cove: 1984 to 2010 change rate = -9.39 ac/yr or -0.144%/yr
This unit is mostly upland.

(021) Hackberry Ridge: 1984 to 2010 change rate = -1.66 ac/yr or -0.018%/yr
This unit is mostly upland, but there seems to be enough wetland acres in this unit to los over the study period.

(023) Lambert Lake: 1984 to 2010 change rate = -156 ac/yr or -0.89%/yr

(024) Madame Johnson Bayou: 1984 to 2010 change rate = -4.34 ac/yr or -0.026%/yr

(025) Magnolia: 1984 to 2010 change rate = -212 ac/yr or -1.01%/yr

(027) Mud Bayou: 1984 to 2010 change rate = -4.38 ac/yr or -0.054%/yr

(028) Mud Lake: 1984 to 2010 change rate = -34.6 ac/yr or -0.213%/yr

(030) Northeast Sabine: 1984 to 2010 change rate = -50.7 ac/yr or -0.455%/yr

(036) Sabine Pass: 1984 to 2010 change rate = -11.3 ac/yr or -0.069%/yr

(038) Sabine Ridges: 1984 to 2010 change rate = -0.87 ac/yr or -0.009%/yr
This unit is mostly upland, but there are enough wetland acres in this unit to lose over the study period.

(040) South Fork Black Bayou: 1984 to 2010 change rate = -0.06 ac/yr or -0.001%/yr

(041) Southeast Sabine: 1984 to 2010 change rate = -18.6 ac/yr or -0.244%/yr

(043) Southwest Sabine: 1984 to 2010 change rate = -75.7 ac/yr or -0.545%/yr

(046) Sweet/Willow Lakes: 1984 to 2010 change rate = -38.0 ac/yr or -0.256%/yr

(047) W. Black Lake: 1984 to 2010 change rate = -35.6 ac/yr or -0.360%/yr

(048) W. Calcasieu Lake Dredge: 1984 to 2010 change rate = -23.4 ac/yr or -0.174%/yr

(052) Willow Bayou: 1984 to 2010 change rate = -8.80 ac/yr or -0.086%/yr

(053) Willow Bayou Canal/Greens Lake: 1984 to 2010 change rate = -6.41 ac/yr or -0.021%/yr

(055) Creole Hwy: 1984 to 2010 change rate = -0.62 ac/yr or -0.024%/yr
This unit is mostly upland, but there are enough wetland acres in this unit to lose over the study period.

(058) E. Big Burn: 1984 to 2010 change rate = -5.67 ac/yr or -0.045%/yr

(059) East Biscuit Island: 1984 to 2010 change rate = -18.0 ac/yr or -0.136%/yr

(061) Grand Chenier Ridge: 1984 to 2010 change rate = -2.61 ac/yr or -0.031%/yr
This unit is mostly upland, but there are enough wetland acres in this unit to lose over the study period.

(062) Grand Lake: 1984 to 2010 change rate = -27.0 ac/yr or -0.051%/yr

(064) Grophes Island: 1984 to 2010 change rate = -35.0 ac/yr or -0.230%/yr

(065) Hog Bayou/Oak Grove Shoreline: 1984 to 2010 change rate = -81.5 ac/yr or -0.587%/yr

(066) Hog Bayou/Oak Grove/Lower Mud Lake: 1984 to 2010 change rate = -45.9 ac/yr or -0.123%/yr

(068) Lake Misere: 1984 to 2010 change rate = -4.78 ac/yr or -0.112%/yr

(069) Little Prairie: 1984 to 2010 change rate = -8.09 ac/yr or -0.057%/yr

(070) Lulu Canal: 1984 to 2010 change rate = -36.9 ac/yr or -0.450%/yr

(074) Pecan Island Ridges: 1984 to 2010 change rate = -42.8 ac/yr or -0.463%/yr
This unit includes upland, but there are enough wetland acres in this unit to lose over the study period.

(077) Rockefeller E./S. Pecan Island: 1984 to 2010 change rate = -165 ac/yr or -0.346%/yr

(078) Rockefeller Shoreline: 1984 to 2010 change rate = -69.5 ac/yr or -1.12%/yr

(084) W. Freshwater Bayou/N. Pecan Island: 1984 to 2010 change rate = -111 ac/yr or -0.308%/yr

(086) White Lake: 1984 to 2010 change rate = -21.1 ac/yr or -0.035%/yr

(087) Willow Island: 1984 to 2010 change rate = -20.3 ac/yr or -0.166%/yr

(088) Big Woods: 1984 to 2010 change rate = -7.32 ac/yr or -0.057%/yr

(089) E. Cote Blanche Bay: 1984 to 2010 change rate = -27.4 ac/yr or -0.041%/yr

(091) E. Freshwater Bayou/Cheniere Au Tigre Bayou: 1984 to 2010 change rate = -85.9 ac/yr or -0.254%/yr

(092) E. Marsh Island: 1984 to 2010 change rate = -30.8 ac/yr or -0.075%/yr

(093) Intracoastal City/NW Vermilion Bay: 1984 to 2010 change rate = -3.08 ac/yr or -0.009%/yr

(094) Live Oak Rd: 1984 to 2010 change rate = -2.82 ac/yr or -0.098%/yr

(097) Southwest Pass Nearshore: 1984 to 2010 change rate = -35.7 ac/yr or -0.209%/yr

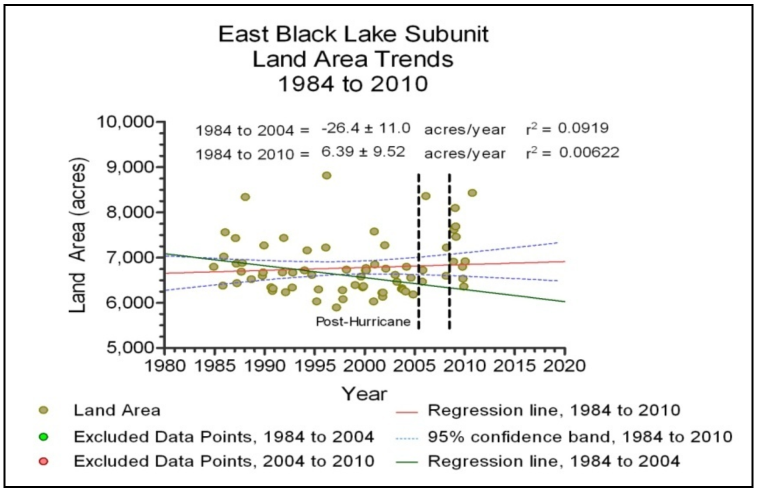
(099) Vermilion Bay: 1984 to 2010 change rate = -35.1 ac/yr or -0.027%/yr

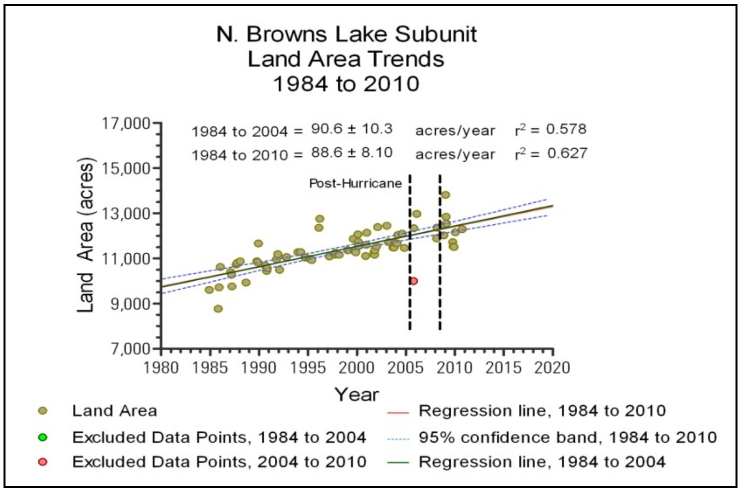
(100) Vermilion Bay Marsh: 1984 to 2010 change rate = -27.7 ac/yr or -0.073%/yr

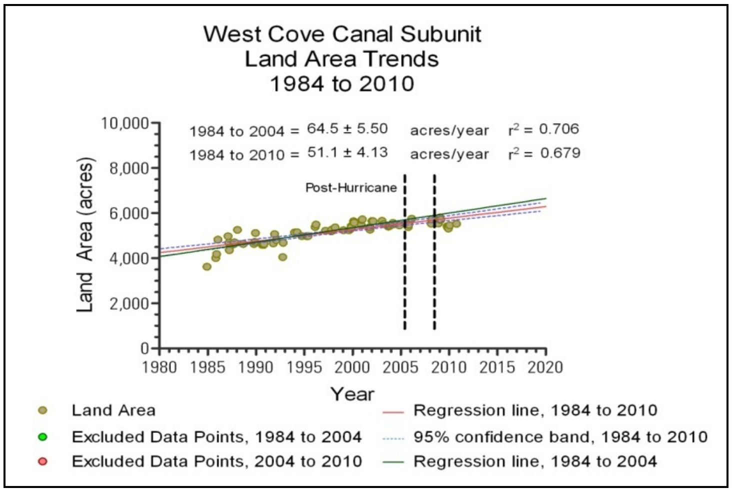
(101) W. Cote Blanche Bay: 1984 to 2010 change rate = -46.4 ac/yr or -0.046%/yr

(103) W. Marsh Island: 1984 to 2010 change rate = -11.4 ac/yr or -0.061%/yr

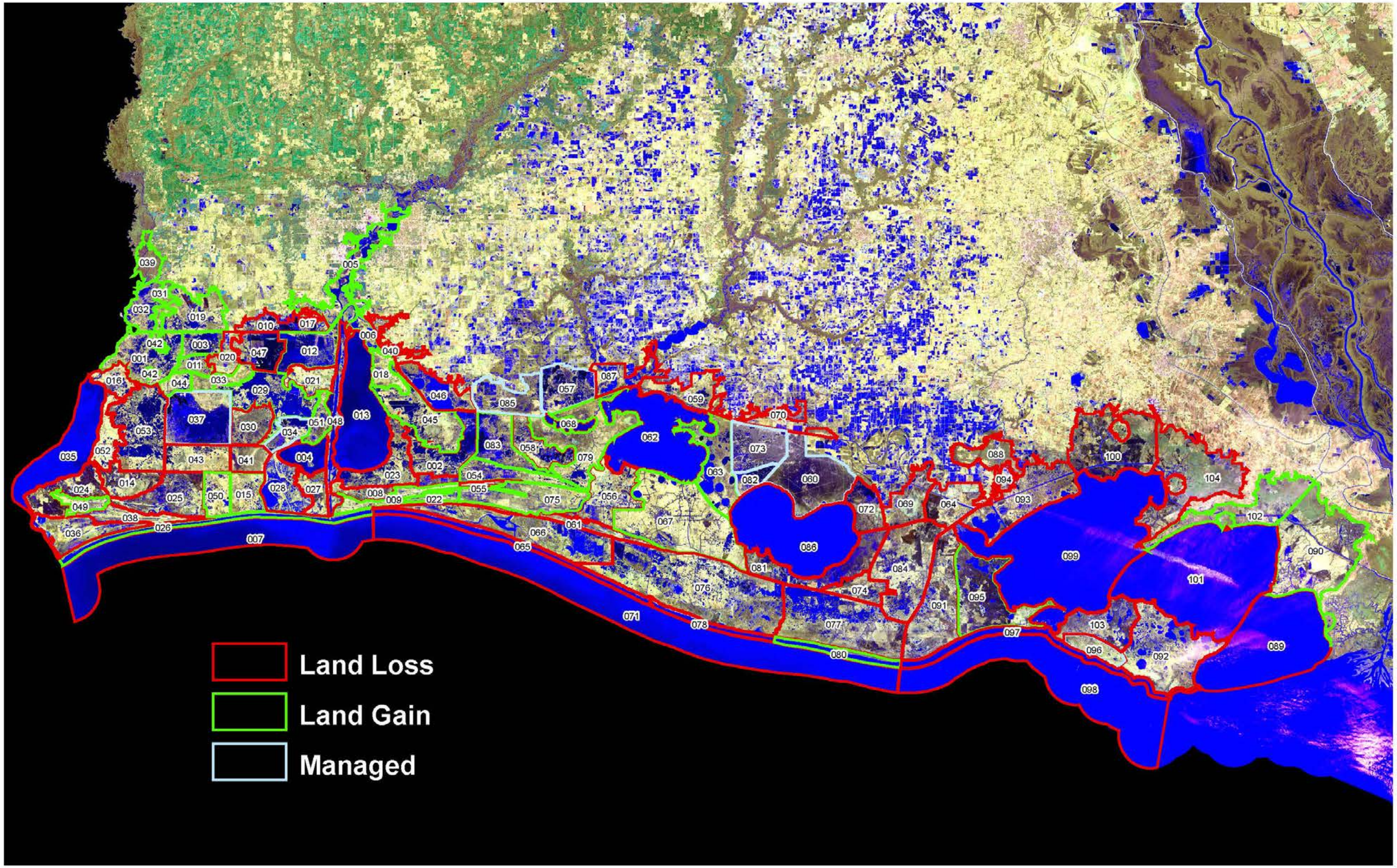
(104) Weeks Bay: 1984 to 2010 change rate = -3.19 ac/yr or -0.007%/yr







Subunits with recent marsh creation


Land Loss
Land Gain
Managed